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ABSTRACT

This book is designed to help academic teachers in middle or secondary education develop an appreciation of career-focused education and begin the process of designing career-focused instruction. (Career-focused instruction is educational programming in which curriculum content and learning experiences clearly connect to the world of work.) For career-technical teachers, these sample instructional units give rich examples of how integrated instruction works in real classrooms. The book contains seven fully-developed, career-focused instructional units at the secondary level. It provides one unit for each of these academic areas: arts, foreign language, language arts, mathematics, and science--plus two units that are interdisciplinary (chemistry, English, and social studies; social studies, language arts, and science). Each unit begins with a section entitled Project Highlights with some or all of these components: instructional topic; grade level; time; overview; major objectives; performance objective; preparatory information for teachers/materials needed; career task scenario; guiding questions; and lists of instructional activities and assessments. Lessons within each unit have some or all of these components: objectives addressed; procedures; assignment(s);activities; career extension; handouts; assessment; and resources. (YLB)

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ITAC
Integrated Technical & Academic Competencies

ED 480 308

CAREER-FOCUSED EDUCATION

FOR OHIO'S STUDENTS

Sample
Instructional
Units

Careers & Academics Together

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Ohio Department of Education Fall 2000

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Welcome

Welcome to this collection of career-focused educational materials!

If you're an academic teacher in middle or secondary education, this book is designed to help you develop an appreciation of career-focused education and to begin the process of designing your own career-focused instruction for your school. If you're a career-technical teacher, these sample instructional units can give you rich examples of how **integrated instruction**–the teaching of careers and academics together–works in real classrooms. It will also give you an idea of how academic teachers respond to this new way of teaching, since all the projects described in this book were created principally by teachers of academic subjects.

The book contains seven fully-developed, career-focused instructional units at the secondary level. These units were created by regional teams of academics and career teachers in Ohio, and have been tested in Ohio classrooms. The book contains one unit for each of the following academic areas–arts, foreign language, language arts, mathematics, and science–plus two units that are interdisciplinary.

In addition, five of the units are accompanied by **classroom demonstration videos,** which can be viewed on the World Wide Web (www.ode.state.oh.us/ctae/itac/) or obtained from the Ohio Department of Education's Center for Curriculum and Assessment (Tel: 614/644-6830). We've included tips on using the videos in workshop settings on career-focused education in the "Suggestions" section of this introduction.

What is Career-Focused Education?

The Ohio Department of Education defines career-focused instruction as **educational programming in which curriculum content and learning experiences clearly connect to the world of work.** The career-focused approach is emphasized for all learners by *Ohio's Future at Work: Beyond 2000,* the strategic plan for career-technical education that reflects changing world realities, higher expectations, and new priorities. Career-focused education ensures that all individuals posses:

Skills needed to compete in the global marketplace

Credentials based on industry standards

Capabilities needed to successfully enter, compete in, and advance through the present and future workforce

Knowledge and skills for lifelong learning

Authentic Instruction

Career-focused education is based on a vision of teaching and learning that actively engages learners in constructing in-depth understanding and applying learning to important, realistic problems. This type of classroom instruction, often referred to as **authentic instruction,** boosts achievement for students of all social backgrounds and in a variety of school contexts. Authentic learning environments also prepare students for success in high performance workplaces.

When you create your own career-focused classroom project, try to include authentic instructional activities such as these: (taken from the Center on Education and Work at the University of Wisconsin-Madison)

- Involve students in manipulating information and ideas by synthesizing, generalizing, explaining, hypothesizing, or arriving at conclusions that produce new meaning and understandings
- Address central ideas of disciplines thoroughly so that students explore connections and relationships and produce complex understandings
- Encourage and require students to engage in extended and productive conversations (i.e. reflection periods) with the teacher and with peers about the topic at hand in a way that builds understanding of ideas or topics
- Connect students to the world beyond the classroom

Learning Standards

Most effective educational programs today rely on carefully developed learning standards to ensure student success. The Ohio Department of Education has designed a set of competencies, called **Integrated Technical and Academic Competencies (ITAC),** to assist teachers in planning career-focused instruction. These competencies are designed to support:

- Integrated instruction that includes active, project-based learning
- Curriculum development for career-focused school programming
- Partnerships with business and industry

The ITAC competencies were developed using a database of national academic, employability, and occupational standards, and were verified by business and industry representatives in Ohio as well as academic and career and technical teachers.

Implications for Curriculum

The career-focused education approach calls for collaboration among all education partners–including comprehensive schools, career centers, and postsecondary institutions–to develop **integrated instruction:** the presentation of academics and career-technical education as a unified whole. To do this, these partners must acquire or develop curriculum materials that support:

- Rigorous academic content
- Successful performance on proficiency tests
- Meaningful learning
- A high level of student engagement
- Authentic, contextualized instruction
- Authentic assessment

Suggestions for Using this Book

The main purpose of this book is to help teachers learn to design their own career-focused projects. The book helps this learning process by presenting a number of rich examples of teachers using the principles of career-focused education in the contexts of their own schools and communities.

But learning to implement career-focused education is a big job, and our first suggestion is to combine the resources of this book with its accompanying World Wide Web site (www.ode.state.oh.us/ctae/itac) **and** with the classroom demonstration videos (also available on the web site or from the Ohio Department of Education).

If you are conducting a workshop or professional development about career-focused education, you'll provide the setting that teachers need to learn about the approach, practice developing projects, and reflect on the experience. In particular, you'll want to show the demonstration videos as a discussion starter, as well as for examples of teachers who have successfully developed projects. After viewing the videos, either singly by academic area or as a whole, we suggest using these questions for discussion:

Discussion Questions

1) Each of the video segments starts with a problem that a teacher saw with teaching the academic content "the old way." Have you experienced any of these problems yourself?

2) All of the teachers in the videos talk a lot about the scenarios they developed. Why do you think the scenarios are so important to them?

3) What would a scenario in your content area look like?

4) All of the video demonstrations show some degree of integration—the teaching of careers and academics together. Which teachers do you feel talked the most about integration in their units? What were the benefits for students?

5) From viewing the videos and/or reading the sample units, would you say these are good examples of authentic instruction?

Group activities are also a must for helping teachers learn how to develop career-focused instruction. Any activity that encourages teachers to give each other feedback about the approach or their uses for it is great. Here are a couple of activities we've thought of:

Activities

Ask teachers, working in groups by subject area, to develop a one-paragraph scenario for a career-focused classroom project of their choice. Then exchange scenarios for peer evaluation and feedback.

If you have access to the Internet, ask teachers to fill out a Project Design Form from the web site (or distribute blank forms yourself). Then, discuss several completed forms as a group. The facilitator should help teachers complete the form in areas where the projects are sketchy or lack essential information (you'll assist or "scaffold" the performance of the teachers).

Author Credits

Fourteen sample instructional units have been published in all, of which seven are contained in this book. Another seven new units can be found on the World Wide Web site. The Ohio Department of Education thanks all the authors of these units–and the students who helped test them–for their hard work and dedication to the theory and practice of career-focused education.

Instructional Units Published in this Book

Unit Title	Author(s)
Artists in Industry: Ceramics	Paula Benfer, Dixie High School, New Lebanon, OH
Sales Associate	Kimberly Gonzalez, Dublin Schools, Dublin, OH
Chemical Weapons Inspection	Carole Bourne, Dan Von Handorf, and Nancy Ingram, Kettering Fairmont High School, Kettering, OH
Land Use	Linda Budd, Colleen Clark-Sutton, Brad Romano, Mike Ryba and Doug Sommers, Garfield Heights High School, Cleveland, OH
Incentives in the Workplace	Starlee Bailey, Clermont Northeastern High School, Cincinnati, OH
All Container Manufacturing	Eleanor J. Stockdale, Columbiana County Career Center, Lisbon, OH
Toxic Waste: Problems in Techno Valley	Jerry E. Ivins, Ed.D, Science Education Council of Ohio, Columbus, OH

Instructional Units Published on the World Wide Web Site

Unit Title	**Author(s)**
Artists in Industry: Ceramics	Paula Benfer, Dixie High School, New Lebanon, OH
Reviewing a Musical Event	Dr. Jackie Quay, Fitton Center for the Creative Arts, Hamilton, OH
Parts of the Body	Deborah Hufstader, The Christopher Program, Columbus, OH
Sales Associate	Kimberly Gonzalez, Dublin Schools, Dublin, OH
Fairview County's Health Issues	Charles F. Kegley, Ph.D., State Planning Committee for Health Education in Ohio, Columbus, OH
Middleburg Personnel Policies	Charles F. Kegley, Ph.D., State Planning Committee for Health Education in Ohio, Columbus, OH
Chemical Weapons Inspection	Carole Bourne, Dan Von Handorf, and Nancy Ingram, Kettering Fairmont High School, Kettering, OH
Land Use	Linda Budd, Colleen Clark-Sutton, Brad Romano, Mike Ryba and Doug Sommers, Garfield Heights High School, Cleveland, OH
Incentives in the Workplace	Starlee Bailey, Clermont Northeastern High School, Cincinnati, OH
All Container Manufacturing	Eleanor J. Stockdale, Columbiana County Career Center, Lisbon, OH
Landscaping Design for City Hall	Margaret Raub Hunt, Ohio Council of Teachers of Mathematics, Strongsville, OH
Toxic Waste: Problems in Techno Valley	Jerry E. Ivins, Ed.D, Science Education Council of Ohio, Columbus, OH
Wetlands R Us: Analysis of the Effects of Commerce on Nature	Carla Huffman, Science Education Council of Ohio, Columbus, OH
Seeking Shangri-La	Donna Nesbitt, Ohio Department of Education, Columbus, OH

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Project Highlights

Instructional Topic	Artists In Industry: Ceramics
Grade Level	Grades nine or ten (Level I or II)
Time	Approximately seven to ten class periods (forty-five to sixty minutes each) approximately two to three weeks student out-of-class time

Overview

Students will explore the relationship of industry with the visual arts. The beginning lessons are done using the Kohler Company model; following lessons can be done continuing with the Kohler model or may be done by connecting with a local company. If done with a local company, adapt to fit the local company. Students will conduct research, inquiring as to the benefits of collaboration in a working industrial program. They will be encouraged to cooperatively explore the resources available. The final phase will be to present their findings to their peers, suggest applications to the classroom environment, and create a ceramic tile related to the industry experience.

Major Objectives

National Standards

1. Understanding and applying media, techniques and processes
2. Using knowledge and structures and functions
3. Choosing and evaluating a range of subject matter, symbols, and ideas
4. Understanding the visual arts in relation to history and cultures
6. Making connections between visual arts and other disciplines

Ohio Competency-Based Arts Model

Goal 1: Historical, Cultural, and Social Contexts: Understanding the Role of The Arts in Peoples' Lives
Goal 2: Personal Expression and Production/Performance: Communicating Through the Arts
Goal 3: Arts Criticism: Responding To The Arts
Goal 4: Nature and Meaning of the Arts: Valuing The Arts

ITAC Core Competencies

1.1 Apply problem-solving and decision-making processes to work-related situations
2.5 Apply listening skills to enhance communication(s)
2.6 Apply demonstration/presentation skills
2.8 Apply artistic communication skills
4.2 Contribute to teamwork
4.4 Demonstrate work ethic
6.2 Use reference materials to obtain information appropriate to a given problem, topic, or situation
6.9 Ensure the quality of products and services

Performance Objective

Analyze and establish the merits of locating an artist in the industrial environment. Then work cooperatively to present evidence of collaboration between an artist and industry in the local workplace (i.e., including skills, tools, design, process, and design).

Preparatory Information for Teachers/Materials Needed

Arrange with school personnel to allow students to visit industries, conduct interviews and/or review media submitted from an industry/company.

Purchase Kohler video:

Sunday Morning, CBS
"Industrial Art: Jacqueline Adams Visits Kohler Plumbing Parts Factory"
September 21, 1997

Copyrighted material available from:
CBS Video
P.O. Box 2284
So. Burlington, VT 054
$29.95 plus 4.95 shipping & handling

To obtain copies of the Kohler Company Arts/Industry brochure, call the Kohler Arts Center at 920-458-6144 and ask for the Arts/Industry Coordinator.

Other possible sources of information for industry connections are:

- your local chamber of commerce for a list of industries, businesses, or cottage industries
- your area career center
- local arts agencies or the Ohio Arts Council in Columbus, Ohio

Career Task Scenario

You are a visual artist who has applied for an industrial residency with a corporation in your community or nearby city. During the residency you will work side by side with the industrial employees for one to three months. You will have a small studio space, but you are expected to share the same tools, materials, and power sources as the industrial workers. You need to adapt to their schedules and use their knowledge to learn new techniques which relate to your ideas or mediums. While in residence, you will have to communicate to them why you are making art. You should be able to communicate your values and knowledge to each other, learning to work cooperatively. In the process you will teach each other the meaning of creative thought. As a result of your experience you are expected to teach others about what you do, be willing to work in a gallery, and create one piece of art to be contributed to the industrial /company environment.

Guiding Questions

1. What benefit is there to industry to support the arts?
2. What benefit is there to an artist to work in an industrial environment?
3. How is understanding and communication enhanced by a collaboration?
4. What job-related skills benefit both industrialist and artist?
5. What purpose do the "products" of art and industry serve?
6. How are decisions and problem-solving processes related in work situations?
7. What can be learned from an art residency in an industrial location?

Instructional Activities Include

- Introduction, vocabulary, expectations, and research
- Students make contacts with local industry or cottage industries, (two to three weeks, depending on resources available, and previous contacts initiated by the teacher)
- Creation of media presentation and graphic materials by the students incooperative groups
- Explore adaptations with tools and media
- Demonstration of applications or adaptations of industrial tools to the visual art classroom using the medium of clay to make tiles for a mosaic relief

Assessments

Lesson One: Assessment (group analysis of Kohler project)
Lesson Two: Holistic writing assessment
Lesson Three: Samples of Assessment Forms

Lesson One

Looking at an Artist-in-Residency Program

Objectives Addressed

National Standards

6. Making connections between visual arts and other disciplines
a. comparing the materials, technologies, media, and processes of the visual arts with those of other disciplines as they are used in creation and types of analysis

Ohio Competency-Based Arts Model

Goal 1: Historical, Cultural, and Social Contexts: Understanding the Role of the Arts in Peoples' Lives
a. discern the reciprocal influence of the arts and social, ethnic, political, spiritual, moral, economic, environmental, and technological issues in diverse periods and times

Goal 4: Nature and Meaning of the Arts: Valuing the Arts
c. recognize and compare the roles of artists, historians, critics, and aestheticians in creating new sensibilities, standards, values, and beliefs about the arts and life

ITAC Core Competencies

2.5 Apply listening skills to enhance communications
6.2 Use reference materials to obtain information appropriate to a given problem, topic, or situation

Procedures

The students will be introduced to these terms (vocabulary study):

apprenticeship
artisan
collaboration
concept
commerce
craftsmanship
internship
jury
patron
proposal
residency
work ethic

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Students will watch the CBS video segment entitled *Industrial Art: Jacqueline Adams Visits Kohler Plumbing Parts Factory* (copyrighted material). Prior to the teacher starting the tape, the students will be asked to take notes and look for evidence to answer the following questions:

1. **What is surprising about having an artist in an industrial location?**
2. **What motivates the Kohler Corporation to have artists-in-residence?**
3. **How do workers react to artists? How do artists react to workers?**
4. **What can artisans and artists learn from each other?**
5. **What skills do you see being practiced in this industrial setting?**
6. **What is the difference between the "practical and the profound?"**
7. **Why is this good business?**

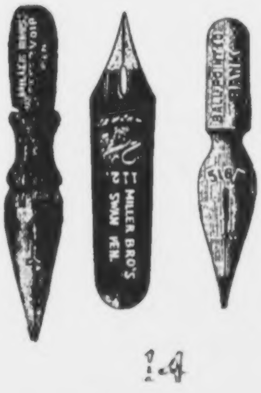
Following the video segment the students will discuss their findings in cooperative groups of four to five. One student will play the role of facilitator; another will be asked to keep a summary of group responses. All group members should agree to the summary and sign off on the document before handing it in to the teacher. The teacher may choose to assess the writing with the Holistic Writing Rubric.

Students will then read the sections in the Arts/INDUSTRY brochure, which is sent to artists who wish to apply for the residency program at the Kohler Factory in Sheboygan, Wisconsin. Students should summarize the information found in the brochure into their notes. They should specifically research the following:

1. **What is a residency program?**
2. **What will the working environment provide for the artist?**
3. **What can the artist access or learn from the artisans in the industry?**
4. **What must the artist demonstrate in order to have their application considered?**
5. **How will the finalists be selected?**
6. **How did the Kohler Company develop this program? Why?**
7. **In what way might the artist, or artist's work, change or grow?**
8. **What obligations will the artist have to fulfill?**
9. **What did you learn about the Kohler Company and patronage?**

Keep both sets of notes in an individual student folder. This will become part of a mini-assessment, student portfolio.

Tell the students that in Lesson Two they will learn why clear communication skills, organization, and record keeping are so important.



Assessment and Holistic Writing Rubric

Lesson One

Members of group:

(Respond below to the following questions. If your group does not have enough space to answer, use the back of the page to say more)

After watching the CBS video about artists in residence at the Kohler Plumbing Factory, we were surprised that:

We think the motivation for this residency program comes from:

We observed the laborers and artists:

We think this is good for business because:

Holistic Writing Rubric for scoring your group

4	Answers were supported with specific examples. Group is able to make many connections between the arts and labor. Group communicates opinions clearly and convincingly.
3	Group gives some examples. A few observations between art and labor are made. Opinions stated clearly, but no support is given for opinions.
2	Few examples are given. Group does not make connections between art and labor, seeing them as separate fields. Few opinions from group.
1	No examples are given. Group has failed to see the connections between art and work. Little effort is given to answers. The group is off task.

ARTISTS IN INDUSTRY: CERAMICS

A Residency Program for Visual Artists

The John Michael Kohler Arts Center

arts/INDUSTRY

A Residency Program for Visual Artists

JOHN MICHAEL KOHLER ARTS CENTER

THE RESIDENCY PROGRAM

Arts/Industry is undoubtedly the most unusual on-going collaboration between art and industry in the United States. Conceived and administered by the John Michael Kohler Arts Center of Sheboygan, Wisconsin, the program makes industrial technologies and facilities available to artists through long-term residencies, short-term workshops, tours, and other programming so that they may further their artistic explorations. Major funding is provided by Kohler Co. and the National Endowment for the Arts.

The primary component of Arts/Industry is a residency program at Kohler Co., the nation's leading manufacturer of plumbingware. Artists have the opportunity to spend two to six months creating works of art utilizing the industrial materials and equipment. Participants are exposed to a body of technical knowledge, which enables them to explore forms and concepts not possible in their own studios as well as new ways of thinking and working.

The Arts/Industry residency program operates year-round to support approximately fifteen artists annually, usually four in residence at a time. Participants may work in the Kohler Co. Pottery, Iron and Brass Foundries, and Enamel Shop to develop a wide variety of work in clay, enameled cast iron, and brass including but not limited to murals and reliefs, temporary or permanent site-specific installations, and functional and sculptural forms.

Artists-in-residence are provided with studio space in the factory which is accessible to them 24 hours a day, seven days a week. In addition, they receive free materials, use of equipment, technical assistance, photographic services, housing, round-trip transportation within the continental United States from their homes to the site, and weekly honoraria.

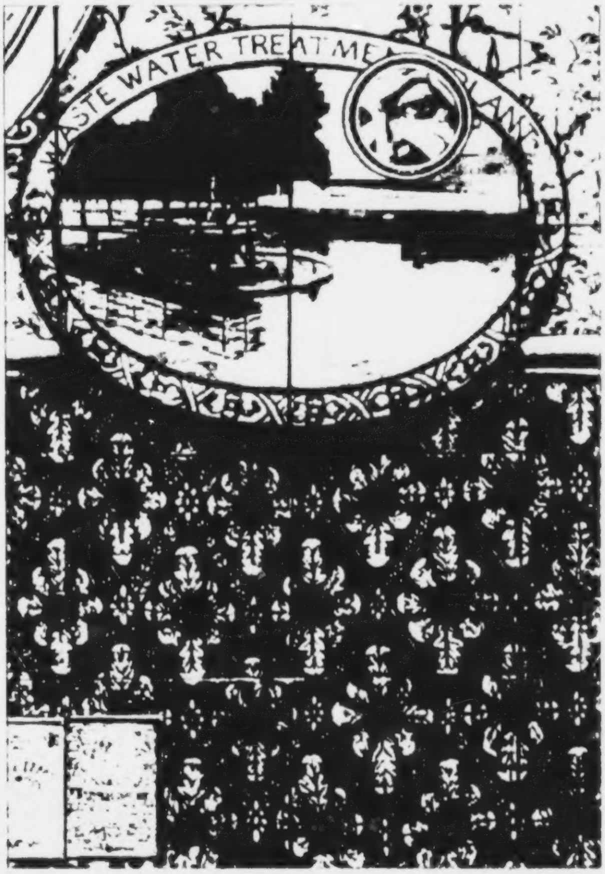
Hundreds of emerging and established visual artists have benefited from the Arts/Industry program at Kohler Co. since its inception in 1974.

Cast-iron bench by Martha Heavenston.

FACILITIES AND MATERIALS

The primary studio space for work in clay is located in the casting shop of Kohler Co.'s Pottery, the largest pottery in the world under one roof. Artists use a strong, off-white vitreous china clay, which is once-fired in oxidation to 2400° F. (cone 10). A kiln fired to 2100° F. (cone 5) is also available. The clay is superb for slip casting and carving but is less effective for throwing and hand building. It is in slip form and is piped under pressure to the artist's studio space. Artists use plaster to make their own molds for slip casting their work. Discarded production molds and ware also can be utilized. Cast pieces can be assembled in various ways before or after firing. Even the plaster is sometimes used to create sculpture.

Artists are encouraged to experiment with the range of glaze possibilities. Color variations may be made by adding ceramic stains (no oxides) to a variety of clear and white glaze bases. Kohler Co. has an extensive Research and Development Laboratory where artists are able to develop glazes.



Detail of Lake Michigan Bathroom Mural *by Ann Agee.*

The Kohler Co. Iron Foundry, the largest in Wisconsin, allows artists to cast or free-pour iron shapes. Artists may create their own patterns and molds, use production discards, or incorporate scrap metal into their work. An array of materials is available for making patterns, including wood, plaster, clay, metal, urethane, styrofoam, and found objects. Artists may use pep-set, green sand, or natural sand for making molds and cores. Enamel base iron is used for casting. Welding and cutting facilities may also be used at certain times.

Artists working in the Iron Foundry may have a periodic access to the Brass Die Cast area where they may cast forms in brass using pep-set or green-sand molds. At times they may also add sprayed metal surfaces to the iron. Carpentry shops are available for fabricating supports, patterns, and armatures.

The Enamel Shop allows artists to use enamel powders directly on red-hot cast iron in single or multiple applications. The Enamel Shop contains 36 large enameling ovens; the use of one is usually reserved for artists. The Enamel Laboratory allows artists to experiment with and test the brilliant vitreous enamels available. Past artists-in-residence have developed liquid and paste enamels for use on somewhat cooler iron and with a variety of stencils.

Arts/Industry provides materials and equipment normally used in factory production free of charge to artists for the creation of their work. Tools and materials not normally used at the factory must be provided by the artists. Artists are asked to pay minimal amounts for the use of brass in excess of 100 pounds and "A-1" company products.

The Arts Center's technicians and Kohler Co.'s industrial craftspeople and engineers provide technical information and advice to resident artists. The artists do the actual work themselves. Assistants are not available unless participants make arrangements with the Arts/Industry coordinator well before the residencies begin; in such cases, the artists-in-residence generally hire and provide remuneration for assistants unless an intern is in residence.

Eligibility and Guidelines for Preparing a Proposal

The Arts/Industry residency program is open to all emerging and established artists working in any discipline. Applying artists need not be trained ceramists or metal sculptors. However, they must have the capability of quickly mastering the industrial technologies. Artists may choose to work in either the Pottery or the Foundry/Enamel Shop or both. However, not everyone who selects both areas may have the opportunity to work in both because of space and personnel limitations. Artists will be notified of such before their residencies begin. Proposals are accepted anytime, but there is an August 1 deadline for residencies for the following calendar year. All applicants must complete the enclosed application form as well as submit the required materials listed below. These materials must be included with the application and not sent separately. To submit a proposal, please send the following to:

Arts/Industry Coordinator
John Michael Kohler Arts Center
608 New York Avenue
P.O. Box 489
Sheboygan, WI 53082-0489

1. Arts/Industry application form;
2. up-to-date resume;
3. 20 slides of your recent work with your name, title of the pictured work, media, dimensions, and date on each slide as well as on the application form. Send only slides that the Arts Center may retain permanently;
4. catalogues, reviews, and/or other publication about your art;
5. a cover letter describing the work you propose to undertake during a residency, why the industrial facility is appropriate, the extent of your experience in materials and processes you wish to use, and a brief statement about your work-e.g., aesthetics, working methods;

Iron pour in the Kohler Factory.

6. drawings of the works you wish to undertake may be helpful but are not mandatory;
7. three alternative residency periods in your order of preference (the minimum residency is two months, the maximum is six months);
8. names, addresses, and telephone numbers of six references who know you and your work well and who may be contacted (describe their relationship to you, i.e., employer, gallery owner, etc.)

Although certainly not mandatory, artists interested in a residency are encouraged to tour Kohler Co. in order to aid them in understanding the possibilities and parameters of the program and in preparing an application. Arts/Industry cannot fund such visits, but the Arts Center staff will schedule intensive tours and otherwise facilitate the artist's stay.

If you have questions concerning the residency program or about making an application, please call the Arts/Industry coordinator at the John Michael Kohler Arts Center, 414/458-6144.

Martha Heavenston (left) and Ann Agee (right) at work in the artist studio space in the Kohler Pottery.

REVIEW PROCEDURE

The selection of artists-in-residence is based upon several criteria: quality of artist's work; feasibility of what the artist wishes to undertake; potential impact of the residency upon the artist and his/her art; ability of the artist to work with Kohler Co. personnel and other artists-in-residence and within factory guidelines; and technical capabilities of the artist. Proposals are reviewed by John Michael Kohler Arts Center staff, past artists-in-residence, and others. In some cases, proposals are reviewed by Kohler Co. ceramic or metallurgic personnel. The review may include several discussions with the artist and the interviewing of references.

Contracts are sent to artists who are selected for residencies. Upon arrival in Sheboygan, participants receive a thorough orientation to ensure a productive residency.

EDUCATION PROGRAMMING

Artists-in-residence are asked to give one day per month to educational activities such as slide-lectures and tours of the artist's work space, workshops, video interviews, and other activities in the region. Through these presentations, JMKAC exposes the public, the arts community, and news media to the artists, their work, and the Arts/Industry program.

Lia Zulalian uses a grinder to touch up her cast-iron work; Chris Weaver provides assistance.

THE ARTISTS' WORK

All of the works produced by artists during their residencies belongs to them. Artists are asked to give one work each to the John Michael Kohler Arts Center and to Kohler Co. Much of the work produced during residency is documented on 35mm slides, a copy of which is given to the artists.

TRAVEL, HOUSING, LIVING

Kohler Co. is in the village of Kohler (pop. 1,900), Wisconsin, which is 50 miles north of Milwaukee and 150 miles north of Chicago. The nearest city, just five miles away, is Sheboygan (pop. 48,000) where the John Michael Kohler Arts Center is located and which is bordered by Lake Michigan on the east.

Arts/Industry artists-in-residence are reimbursed for basic round-trip travel expenses within the continental United States. They are encouraged to bring their own cars. Free housing for the four artists who are in residence simultaneously is provided in a furnished, four-bedroom house near the site. Each artist also receives a modest honorarium for food, personal expenses, and shipping finished work. Additional details about the residences are sent to artists upon their acceptance into the program. Program parameters are based on available funding and other conditions and are thus subject to change.

INTERNSHIPS

Internships are available for undergraduate and graduate art students. Interns generally aid artists-in-residence and, in addition, may work with John Michael Kohler Arts Center staff on the documentation, maintenance, and exhibition of the Arts/Industry collection or on other aspects of the Arts Center's program and operation. Interns usually have some access to the industrial technologies for their own art. For further information, contact the Arts Center's Arts/Industry coordinator or human resources coordinator at 414/458-6144.

A BRIEF HISTORY OF ARTS/INDUSTRY

In the summer of 1973, a national ceramics invitational exhibition titled THE PLASTIC EARTH opened at the John Michael Kohler Arts Center and heralded the beginning of a new collaboration between the arts and industry. The exhibition of over 300 works by 87 American artists was organized by JMKAC and sponsored by Kohler Co. as part of its centennial celebration.

A one-day seminar developed by JMKAC at the opening of THE PLASTIC EARTH brought artists together with Kohler Co. engineers and artisans in discussions and demonstrations of the industrial ceramic technologies. That seminar also laid the groundwork for a program that would encourage continued dialogue between artists and industries. Arts/Industry began in August 1974 with a four-week pilot residency in the Kohler Co. Pottery for Ohio artist Jack Earl and Louisiana artist Tom LaDousa. Earl and LaDousa worked 12- to 16- hour days and produced over 120 sculptures fashioned from plumbingware fixtures which they cut apart, reassembled, or altered. A spirited and controversial exhibition of the major works led to a lively dialogue in "Letters to the Editor" of Ceramics Monthly magazine and among ceramists around the country. An unexpected yet significant element of the residency was the rapport which grew between artists and industrial personnel. In fact the pilot residency proved to be so rewarding for all involved that both Earl and LaDousa were invited to return in December 1974.

Because of the very visible success of these activities, the John Michael Kohler Arts Center was asked by the American Craft Council to host a unique conference, INDUSTRY AND THE ARTIST/CRAFTSMAN, in 1975. Over 150 artists participated in intensive tours, panel discussions, and workshops in six Sheboygan area industries: Bemis Manufacturing Co.; Kohler Co.; Nemschoff Chairs, Inc.; Thonet Industries, Inc.; The Vollrath Company; and Wigwam Mills, Inc. This conference led, in turn, to a collaborative project between two artists and Wigwam Mills as well as to the continuation of the residency program at Kohler Co.

In 1976, eight artists under the leadership of Jack Earl participated in six-week to four-month residencies which strengthened the bond between artists and industry artisans. The artist worked primarily in the Kohler Co. Pottery but made occasional forays into the Enamel Shop where they enameled cast-iron discards. Over the next eight years, six to eight artists participated annually in summer residencies in the Kohler Co. Pottery. In addition, in 1978 and 1981 the Arts Center developed intense two-week technical workshops devoted to mold making and slip casting. Nearly 50 artists participated in each workshop.

Many of the artists who applied to the program expressed an interest in year-round residencies up to six months in length. That became a reality in 1984, and since then approximately 15 artists have been in residence each year. The new schedule has allowed a greater flexibility for artists and the opportunity to undertake large-scale commissions and other major works as well as the continuing emphasis on the exploration of new processes and new directions. In the late 1980s, particular emphasis was placed on extensive involvement in the Iron Foundry and Enamel Shop. Since 1974, over 550 artists have utilized the vast resources of area manufacturers in Arts/Industry. Among them Maria Alquilar, Aurore Chabot, Christopher Davis-Benavides, Eddie Dominguez, Nancy Dwyer, Jack Earl, Christine Federighi, Ron Fondaw, Ann Gardner, Lauren Grossman, Deborah Horell, Indira Freitas Johnson, Joyce Kozloff, Ken Little, Allie McGhee, Masako Miyata, Richard Notkin, Joel Otterson, Tom Rippon, Terry Rosenberg, Tom Spleth, Susan Walsh, and Arnie Zimmerman.

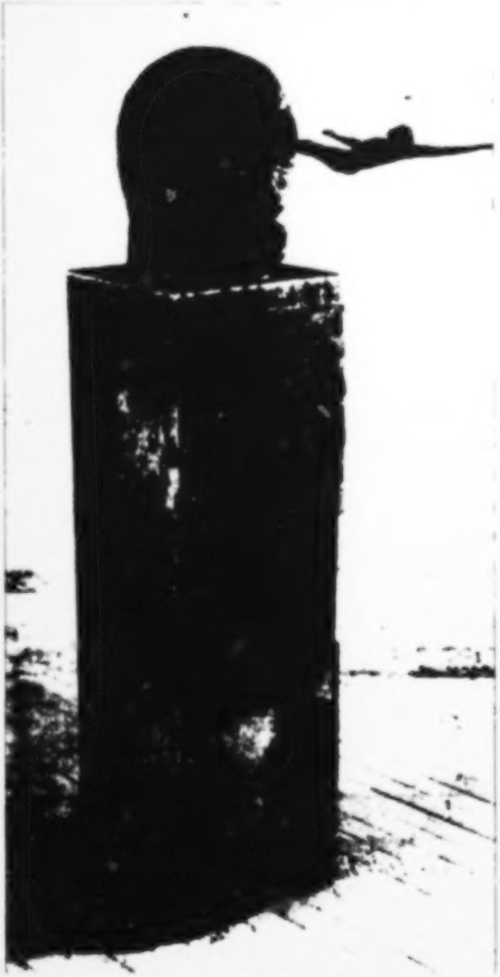
JOHN MICHAEL KOHLER ARTS CENTER

Founded in 1967, JMKAC is a thriving visual and performing arts complex that functions as a center of cultural life in east-central Wisconsin and also attracts thousands of visitors from throughout the Midwest. JMKAC has earned national renown for its innovative and challenging exhibitions and for the ambitious scholarly publications developed in conjunction with them. The exhibitions and related programming serve as a forum for the investigation of a wide range of contemporary American Art, in particular photography, installation works, craft-related forms, the work of self-taught artists and visionaries, communally transmitted continuing traditions, and other genres of art making that receive limited exposure.

Philosophically, JMKAC is dedicated to working directly with artists and to providing opportunities for them in both the visual and performing arts. In addition to Arts/Industry and the exhibitions, the Arts Center is acclaimed for its exhibition-related residencies, collaborative projects between artists and community residents, Summer Theatre, FOOTLIGHTS performing arts subscription series and related residencies, classes for children and adults, festivals, Great Cardboard Boat Regatta, a second-site exhibition space called Artspace, and a host of other programs.

KOHLER CO.

Founded in 1873, Kohler Co. has become the nation's leading manufacturer of plumbing and specialty products, as well as a major producer of generators and four-cycle engines. The company has acquired two distinguished furniture manufacturers, Baker, Knapp and Tubb, Inc. and McGuire Furniture Company, and operates a variety of successful hospitality businesses, among them the famed American Club Resort hotel and Blackwolf Run, with two challenging championship golf courses. Headquartered in Kohler, Wisconsin, one of the earliest planned industrial garden communities in the United States, Kohler Co. is among the oldest and largest privately held companies in the country. It employs more than 14,000 people worldwide, with approximately 6,000 at the Wisconsin headquarters.



Untitled cast-iron sculpture by Steve Bradford.

David Phelps unmolds a ceramic work in Kohler Pottery.

JOHN MICHAEL KOHLER ARTS CENTER

608 New York Avenue
P.O. Box 489
Sheboygan, WI 53082-0489
414-458-6144

BEST COPY AVAILABLE

Lesson Two

The Application Process

Objectives Addressed

National Standards

2. Using knowledge and structures and functions
a. demonstrate the ability to form and defend judgments about
the characteristics and structures to accomplish commercial,
personal communication, or other purposes of art

4. Understandng the visual arts in relation to history and cultures
c. Analyze relationships of works of art to one another in terms
of history, aesthetics and culture, justifying conclusions made in
the analysis and using such conclusions to inform their own art making

Ohio Competency-Based Arts Model

Goal 4: Nature and Meaning of the Arts: Valuing the Arts
c. recognize and compare the roles of artists, historians,
critics, and aestheticians in creating new sensibilities, standards,
values, and beliefs about the arts and life

ITAC Core Competencies

1.1 Apply problem-solving and decisions-making processes to work-related situations
6.2 Use reference materials to obtain information appropriate to a given problem,
topic, or situation

Procedures

- Review the terminology from Lesson One.
- Review the inquiry and research that was done in Lesson One. Summarize the class findings on a chart and post it in the room.
- In small groups, ask students to review the application for the Arts/INDUSTRY artist-in-residence, which might be submitted to the John Michael Kohler Arts Center.
- Discuss the various sections of the application form. Questions to consider:

1. What is the Kohler program trying to discover about the applicant?

2. What kinds of evidence do you think would give the reviewer of the application a "sense" of commitment, skill, creative expertise, communication skills, and reputation on the part of the artist applying?

3 How important is it that an artist be able to write and communicate well? Defend your opinion.

The teacher will call the groups to order and ask them to summarize their responses for the whole class. Then continue by asking the cooperative groups to briefly discuss the following:

1. **If you were going to find references for your application, what criteria would you use to select people to speak in your behalf?**
2. **If you submitted slides of your work, speculate on how you would select those pieces that would present your work in its best light. What do you think the jury would be looking for?**
3. **Which is more important, your recommendations or your creative work? Defend your answer.**

The teacher will call the class's attention to the last section of the Kohler Arts/INDUSTRY application, called "Brief Summary of Your Proposal."

Instruct each individual student to write a brief proposal of what they would like to create as a body of work if they were allowed to work in the ceramic section of the factory with the artisans. Ask them to use the following prompts:

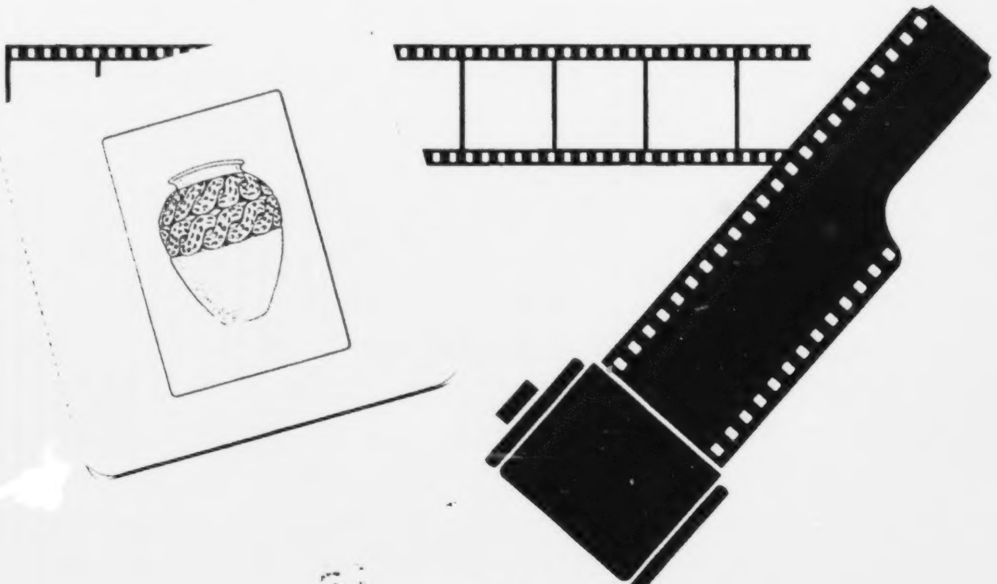
> *"If I created a series of works in the Kohler factory, I would want to explore the following concepts:"*
>
> *"In the collaboration of workers and artists, I think my work would be unique because:"*

A rubric to evaluate the writing holistically is included. Place the writing and the evaluation tool in the mini-portfolio.

Career Extension **Invite a professional photographer to share expertise and real life career information.**

If the teacher wishes, this would be an appropriate place to teach students how to document their student work by taking slides of created pieces. This would teach them the concept of portfolio documentation and organization. If the teacher is not versed in photography, a parent or local photographer might be willing to come give the students some simple instructions on how to take slides under correct conditions.

Before the class adjourns, the teacher should explain that in the next lesson, they will be selecting businesses or cottage industries to visit.



Assessment and Another Holistic Writing Rubric

Lesson Two

Use the following criteria when evaluating the individual student writing for their proposal. This is the section on the application for the Kohler Visual Arts Residency Program.

The teacher may wish to make this a weighted assignment.

EXCEEDS CRITERIA	Four points Remarks show that the student is thinking critically about the role the artist would play in the industrial setting. Student is able to communicate clearly that the concepts or ideas would be new, stimulating, and challenging. Student understands the opportunity to collaborate and feels their residency would also contribute to the well being of the industrial setting.
MEETS CRITERIA	Three points Comments make some connections between the art ideas and the needs of the industry. The ideas are meaningful, but are not particularly challenging. Remarks are organized well, and give some illustrations.
CRITERIA ARE MET IN MINIMAL WAY	Two points Few connections are made that relate the art ideas to the industrial setting. There is minimal communication and ideas are poorly written. There is little which supports or clarifies remarks.
DOES NOT MEET CRITERIA	One point Does not make connections. Clearly does not understand why an artist needs to communicate well, have individual ideas, or would want to be part of an industrial residency. Very little effort made. There are few sentences, poorly supported.

ARTS/INDUSTRY
Artist-in-Residence Application

JMKAC use only *rank*

rec'd

This form is used in the selection process. If it is not filled out **PROPERLY AND COMPLETELY** *the selection committee will be unable to make a decision about your work. For additional application criteria, refer the "Eligibility and Guidelines for Preparing a Proposal" in the Arts/Industry Brochure.*

Please type or print clearly.

Name

Address

City State Zip

Home Telephone Work Telephone

WHAT IS YOUR PREFERRED AREA OF CONCENTRATION?

○ Foundry/Enamel Shop ○ Pottery

WHAT LENGTH RESIDENCE DO YOU WISH?

○ 2 months ○ 3 months ○ 4 months ○ 5 months ○ Other

WHAT ARE THREE TIME PERIODS YOU COULD BE IN RESIDENCE IN ORDER OF PREFERENCE?

	Month	Day	Year		Month	Day	Year
1.				to			
2.				to			
3.				to			

REFERENCES *who know you and your work well and who may be contacted. (Please list six.)*

	Name *(first,last)*	Relationship to you	Full Address	Phone *(work,home)*
1.				
2.				
3.				
4.				
5.				
6.				

EDUCATIONAL BACKGROUND

SLIDE INFORMATION

Note diagram below for labeling slides. Please note: digital/printed images will NOT be accepted in lieu of slides.

	Title/Dimensions	Media	Year Created
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
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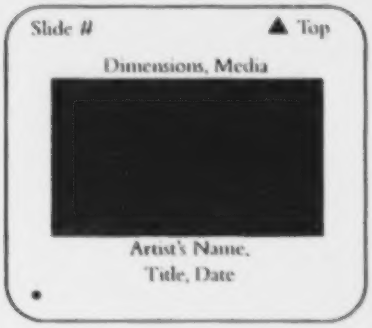
16.			
17.			
18.			
19.			
20.			

BRIEF SUMMARY OF YOUR PROPOSAL



ENCLOSE ALL APPLICATION MATERIALS WITH THIS FORM AND SEND TO:

Arts/Industry Coordinator
Heathermarie Podulke
608 New York Avenue
P.O. Box 489
Sheboygan, WI 53082-0489
920-458-6144 x133

www.jmkac.org

Lesson Three

The Industrial Perspective

Objectives Addressed

National Standards

2. Using knowledge and structures and functions
a. demonstrate the ability to form and defend judgments about the characteristics and structures to accomplish commercial, personal communication, or other purposes of art

4. Understandng the visual arts in relation to history and cultures
c. Analyze relationships of works of art to one another in terms of history, aesthetics and culture, justifying conclusions made in the analysis and using such conclusions to inform their own art making

Ohio Competency-Based Arts Model

Goal 3: Art Criticism: Responding to the Arts
c. evaluate the arts forms using appropriate criteria

Goal 4: Nature and Meaning of the Arts: Valuing the Arts
c. recognizing and comparing the roles of artists, historians, critics, and aestheticians in creating new sensibilities, standards, values, and beliefs about the arts and life

ITAC Core Competencies

1.1 Apply problem-solving and decisions-making processes work-related situations
2.5 Apply listening skills to enhance communication(s)
2.6 Apply demonstration/presentation skills
4.2 Contribute to teamwork
4.4 Demonstrate work ethic
6.2 Use reference materials to obtain information appropriate to a given problem, topic, or situation

Procedures

Begin by reviewing vocabulary. Then the teacher will explain that the focus for today's activity will turn from the artist's application to the industrial perspective. The class will build a questionnaire that they will use as a guide when groups of three to four class members go into the community to interview laborers, management, or public relations directors in local industrial settings.

Career Extension

Invite a job placement manager to the classroom to discuss real life situations about interviewing job candidates, and interview instruments.

The teacher will remind the class to draw upon knowledge from the example of the Kohler Residency; the Kohler application, brochure, and video; the cooperative group notes done in class; and the vocabulary list.

The teacher will begin by reading this scenario:

"You and two other students have made an appointment to visit a member of a local industry. Your purpose in doing this is threefold. One: you want to know more about work opportunities in your community. Two: you want to explore the possibility of collaboration between the fine arts and industry. Three: you want to communicate that there is reciprocal learning which can benefit both the employees and the artists in collaboration."

In order to accomplish this you must:

- Explain to the person being interviewed how you came to believe in this idea of collaboration between industry and the fine arts
- Show an interest in the industry itself and be open to learning how it serves the community
- Be open to exploring ideas or opportunities that might grow into collaboration experiences
- Serve as an ambassador for the school, the fine arts, and the future work force

To design a simple questionnaire:

1. Give out index cards to each student (may be color-coded for sorting).
2. Put students in pairs of two.
3. Write four to five questions using some of the vocabulary words in the questions.
4. Write four to five questions that stem from the Kohler Residency Model.
5. Write two or three questions from an artist's point of view.
6. Write two or three questions from an industrial point of view.
7. Gather all the cards. Put students in groups of four.
8. Read through and eliminate duplicate concerns, or rewrite.
9. As a class, read the questions aloud, selecting and eliminating until the class agrees upon the questions.

In addition, the teacher should send the students into the interviews with the guidance below. Note that all the letters and request forms are included and ready for photocopying in this book.

- A letter explaining the purpose of the lesson or visit
- A request for information about the local company
- A request for "cast offs," common tools (not expensive), or recyclables for the next lesson
- Invitation to industry partner to be placed on school letterhead or to be designed in graphics by the students

The teacher will establish a time line for the interviews to be conducted. The interviews will be noted by all group members. Each group member will have a copy of the interview to be placed in the student's individual mini assessment portfolio.

Students might be encouraged to take along a camera for taking photos, slides, or videos of the industry. The teacher might create an assessment tool to evaluate all evidence that the student accumulates (i.e., questionnaire, photos, brochures, etc.).

Upon the students' return, the teacher will ask students to create a display that will highlight the industry they visited. The display will answer the following questions:

1. What did you learn about the industry you visited?
2. What was the interest of the industry in creative collaboration?
3. What problems present themselves to prevent collaboration?
4. How are the fine arts presently contributing to the life of the facility?
5. What evidence is present that contributes to the belief that creativity and labor belong in the same environment?

The teacher may determine a way best suited to his/her needs to assess the group's progress and products. There are some examples for group assessments and a collaborative group assessment form is included near the end of this project for you to use.

The students should send letters of thanks and photo documentation of their findings to the person or persons they interviewed. Or, the industrial representative might be invited to an "opening" if the class pursues this further in Lesson Four.

ARTS: ARTISTS IN INDUSTRY: CERAMICS

Lesson Four

Creating Art

Objectives Addressed

National Standards

1. Understanding and applying media, techniques, and processes
b. students conceive and create works of visual art that demonstrate an understanding of how the communication of their ideas relates to the media, techniques, and processes they use

3. Choosing and evaluating a range of subject matter, symbols, and ideas
b. apply subjects, symbols, and ideas in their artworks and use the skills gained to solve problems in daily life
c. describe the origins of specific images and ideas and explain why they are of value in their artwork and in the work of others

Ohio Competency-Based Arts Model

Goal 2: Personal Expression and Production/Performance: Communicating Through the Arts
c. improvise with and control varied artistic media, instruments, resources, and processes

ITAC Core Competencies

2.8 Apply artistic communication skills
6.9 Ensure the quality of products and services

In this lesson the teacher will use the medium of clay or any other casting material to create a visual collage which connects to Lessons One, Two, and Three.

Remember that in the videotape that introduced the class to the Kohler Residency, one of the benefits of artists and laborers working side by side was to mentor each other. Both careers had lessons to teach each other. Both roles learned to value the others' expertise. One common denominator was that they shared the same place, similar methods of labor, and tools of the trade. For example, one artist found a "perfect" scraper for cutting and refining her sculpture: it was a Kohler laborer's tool.

In conjunction with the interviews, students asked for some "tools of the trade" that might be recycled: cast offs, or inexpensive tools. In addition, the teacher may collect industrial tools like gears, computer parts, baker's tools, mechanic's tools, health care instruments, personal grooming tools, communication tools, etc.

In a visual art studio, the students might explore using these tools as their ceramic tools. Explore how they texture, cut, sculpt, model, and define the clay. Have students share their findings with their classmates. Chart their findings. Create ceramic samples to be exhibited with the tool.

The goal is to create a mosaic tile wall that will use the tools of labor as its theme. Each student will make one or several 4 x 4 tile(s) out of clay. (If dried on plasterboard, used in drywall for home construction, you will have less warping of the tiles. They must be roughed on the back before drying. They will be secured to a wall or board with "Liquid Nails," a caulking material found in lumberyards. The tile could be glazed, stained, or remain unglazed, but they would have to be grouted together.) The tiles will be numbered and placed on a grid. The tools collected will be used to create textures and marks in the clay. The tools might be pressed into the clay and pulled away to leave their impression. The names of the companies could be stamped into the clay with alphabet stamps. The names of the persons interviewed could be added with needle writing. Students might create tiles in which they write quotes from the persons they interviewed. Quotes might discuss dreams for including the arts and industry, documentation of ways industry already includes the arts, or the benefits of collaboration with industry.

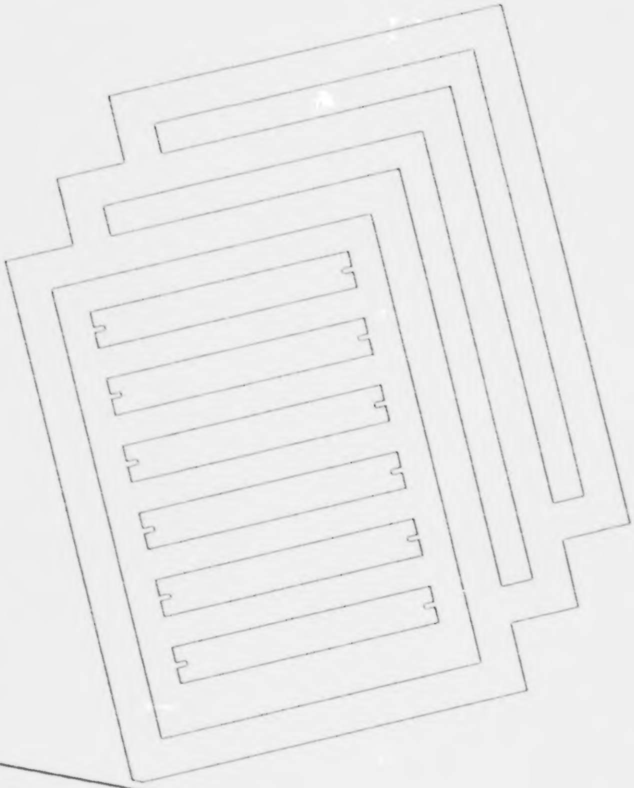
Once the composite tiles are ready, the class would fire them. Then they might be stained, glazed, or finished as the teacher selects. The finished work could be mounted on a sheet of plywood and framed, attached to a public wall, or mounted more permanently with the help of professional laborers.

For instance, the students might create a piece for the Chamber of Commerce, city square, city hall, etc. This would put students in the position where they have to get public approval through proposal, present proper paperwork, find funding, think about legal ramifications, work with the media, etc.

Upon completion, the students might invite their parents, the corporations or industry representatives, public officials, school personnel, etc. to an unveiling. Remember that one of the requirements for the artists selected by Kohler is that the artist must be willing to give one piece to the organization. They must teach or make presentations about their work. Like these artists, students would be giving something of what they learned back to their community. They might share:

1. their multimedia displays from Lesson Three;
2. information about the industry they visited;
3. photos or a video of how they created the ceramic tile piece;
4. written or oral presentations of what they learned about collaboration;
5. documentation of putting public works before the public.

Resources



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Sample request letter request for information about the local company

My students will be making a multimedia display or presentation to the rest of the class about your company.

If you agree to this concept, please allow the following:

1. They may wish to take photos, slides, or videos.
2. They would appreciate any printed public relations materials you have available for their use.
3. Should you have any photos or videos that they might use temporarily in the display, please consider lending them.
4. If you have any restrictions or concerns, please discuss this with them at the time of their interview with you.

Thank you.

Request for "cast offs," common tools (not expensive), or recyclables for the next lesson

(enclose with letter from previous page)

One concept the Kohler Arts/INDUSTRY residency has taught my students is that laborers and artists learn from each other. They may practice similar methods of construction, use similar tools, market their work, etc.

In the video my students watched there were artists working side by side with industrial workers. Some of the tools the factory workers were using were put to work by the artists for creative purposes. For example, a planing tool was used to clean clay from an art piece once it changed hands from the industrial worker to the artist.

My students are going to create a ceramic mural about "Tools of Work" and what they learned in their interviews. I am requesting the following:

- **Are there small, inexpensive tools of your trade we might borrow to make impressions in clay tile for our mural?**
- **Do you ever recycle small hand tools? May we have a sample of them to experiment with in clay?**
- **Are there industrial "cast offs" or recyclables which my students might use in the art room to explore alternative creative uses?**

It would be greatly appreciated if you might gather a few items for my students to bring back to the school after they interview you.

Thank you for your tolerance and understanding.

Invitation to industry partner (to be designed by students)

Select one of the following:

- Be sure to invite your industrial partners to any opening or unveiling of your students' public work
- Have the students take photos, or make a video of the unit. Make copies and submit them to the industry
- Volunteer to make a presentation to the industry after the unit is complete. Include student presenters
- Use local cable access to publicize the effort on TV
- Ask the industrial PR director to help you gain recognition for the collaboration of their company with the schools
- Have students write editorials or articles for the local paper or the arts section
- Make a presentation to the local Chamber of Commerce about the unit

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Sample letter explaining the purpose of the lesson or visit

(use school letterhead here)

date

inside address

Dear ____________________:

This letter is being sent to you as a means of clarifying the visit you are scheduled to have on (day of week, date, time) with students from (name of high school). Thank you for allowing my students (insert names) to interview you.

The unit we are studying is part of the Ohio initiative called "School to Work." My students have been considering the collaborative efforts of artists with industries. As part of this unit they have explored the Arts/INDUSTRY residency program at the Kohler Plumbing Co. in Sheboygan, Wisconsin. My goals for my students include collaboration, research, communication, problem-solving, and analysis of work-related situations. I am trying to get my students to explore their community first hand, respond to the information they gather, work collaboratively in the arts, and finally to share the products with the public.

The students will come to you in small interview groups. They will have a questionnaire they have written to guide the discussion. In addition, if you might be kind enough to share some of the information outlined for you on the enclosed sheets, this would be very helpful. Should you agree, the students might like to see some aspect of your production facility. I yield to your expertise however and understand safety precautions.

You will be informed by my students periodically on the progress in this unit. The culmination will be an invitation to you to see the fruits of their learning first hand as they present a public work.

Thank you for your time and support. Do not hesitate to call me if you have further questions please call me at (phone number).

Respectfully written,

signature

Collaborative Group Assessment

Lesson Three

The teacher observed the following in your collaborative efforts:

	low		high
All members of group participated.		1 2 3 4 5 6	
It appeared that you were working cooperatively.		1 2 3 4 5 6	
From the conversation I could tell you were thinking critically about the questions proposed.		1 2 3 4 5 6	
You were able to make many observations and were able to support them with examples.		1 2 3 4 5 6	
At the present time I feel your understanding of the lesson would be rated as:	poor	average	high

Assessment Tool: Studio Experience

Lesson Three

Student : ______________________ *(self-assessment)*

	low high
My tile is unique in the way I explored the use of tools to create textures:	1 2 3 4 5 6
I have used some tool shapes to become the center of interest in the tile:	1 2 3 4 5 6
I have included writing in some way to be part of the overall work design. (quote, signature, logo, company name)	1 2 3 4 5 6
My design carries out beyond the 4 x 4 format to the tiles around it. Thus my image is "collaborative" in the total design.	1 2 3 4 5 6
I used elements and principles of design effectively.	1 2 3 4 5 6
My level of craftsmanship.	1 2 3 4 5 6
My level of effort and initiative.	1 2 3 4 5 6

Comments to teacher:

Teacher assessment: **(for above student)**

Your tile is unique in the way you explored the use of tools to create textures:	1 2 3 4 5 6
You have used some tool shapes to become the center of interest in the tile:	1 2 3 4 5 6
You have included writing in some way to be part of the overall work design. (quote, signature, logo, company name)	1 2 3 4 5 6
Your design carries out beyond the 4 x 4 format to the tiles around it. Thus your image is "collaborative" in the total design.	1 2 3 4 5 6
Elements and principles of design are used effectively.	1 2 3 4 5 6
Craftsmanship.	1 2 3 4 5 6
Effort and initiative.	1 2 3 4 5 6

Suggestions & Praise:

40

·Old Faithful·
Marking Crayon
BLUE No.2000

FOREIGN LANGUAGE: SALES ASSOCIATE PROJECT

Project Highlights

Instructional Topic	Sales Associate Scenario
Grade Level	Stage One (Novice level - typically grade nine)
Time	approximately ten class periods (fifty to fifty-five minutes each)

Overview

Students will explore the relationship of retail industry and foreign language. They will research, via the Internet and through an interview with a professional sales associate, the current mode of fashion of the target language country they are studying. The unit works best with approximately twenty-five to thirty students and with cooperative groups of three students each for certain activities.

Major Objectives

Ohio Competency-Based Foreign Language Model

1. Multidisciplinary Connections, Information, and Knowledge
2. Participate in small group communication activities to develop communication skills
3. Insights into the Nature of Language and Culture
4. Compare how various linguistic elements are expressed in English and in the target language
5. Cultural Knowledge
6. Develop sensitivity to cultural differences

ITAC Core Competencies

2.2 Apply oral communication skills
2.6 Apply demonstration/ presentation skills
4.1 Demonstrate leadership
4.2 Contribute to teamwork

Performance Objective

Locate a local sales associate or manager in the retail industry. Students will then interview the sales associate and make a connection of importance to foreign language and retail. Students will also work cooperatively to create a mock sale from the information that they have gathered in the target language about current modes of fashion and meet the criteria for a Stage One learner.

Stage One learners are just beginning to develop the ability to speak, listen, read, and write in a foreign language. Stage One learners are able to speak and write using short sentences, which contain learned words and phrases. They demonstrate the ability to understand the target language when it is spoken in short, simple phrases and sentences. In addition, they are able to read brief texts with comprehension. For Stage One learners, comprehension is further enhanced when the spoken language and written text are supported by visual cues and gestures.

Preparatory Information for Teachers/Materials Needed

Teacher will need articles of clothing in various colors and balloons for review of color and clothing.

Career Task Scenario

A local department store is not doing well in meeting current sales goals. As a sales associate interviewing for a local department manager position, you are going to sell yourself by putting together a plan that would attract more customers and increase clothing sales in the store. Part of your plan includes putting together a successful sales team that will reach not only the English speaking customers but also aim toward those not proficient in the English language. Your group will be gathering information about the non-English speaking people and determine the best sales plan to reach the goal of the company: Sell merchandise and make money! To prepare to help the non-English speaking customers, you will:

- Review vocabulary of clothing and colors
- Create a list of commonly used expressions that might be needed
- Interview a local sales associate or manager in the retail business
- Become culturally aware of current modes of fashion in the target language country being studied
- Research current exchange rates and learn how to convert to American dollars

The product of your research will include the sales advertisement for the department store and also the mock sale that will take place. Your group will be responsible for successfully communicating in the target language being studied and demonstrating your knowledge of the vocabulary and expressions needed for a sales scenario conversation.

Guiding Questions

- What are the essential expressions and vocabulary needed?
- What type of information about the ethnic groups do we need?
- What are the realistic types of information that customers are asked in a department store?
- What are the current exchange rates?
- Where do we go to obtain the cultural information needed?
- What are the current fashions that would be appropriate to include in the advertisement?

Lesson One

Review Colors and Clothing

Procedures

The students will be introduced to the following vocabulary words and phrases in the target language being studied:

- pants
- jeans
- shorts
- t-shirt
- dress
- hat
- boots
- shoes
- sandals
- bathing suit
- shirt
- skirt
- sweater
- socks
- pantyhose
- jacket
- coat
- belt
- gloves
- May I help you?
- What color do you like?
- What size do you need?
- It costs...

1. Students will observe different authentic articles of clothing and compare them to the modern day clothing worn by people of the target language being studied.

2. Students will compare the current fashion of both the target language country and the United States. Students will be given a chart to fill in that compares both cultures. (See the Venn diagram in the Resources section.)

3. The teacher will review colors by using balloons. The teacher will model correct pronunciation and have students repeat as he uses the balloons as a visual. Suggested questions that one could use in their target language to accompany this activity are:

- **What is your favorite color?**
- **What colors are in the American flag?**
- **What colors are in the Mexican flag?**
- **What are your favorite football team's colors? Baseball team? Basketball team?**

4. The teacher will play a game called "Which One is It?"
The teacher will choose three balloons and hide them in a bag or pocket. Students will try to guess which colors are hidden using the target language. The student who guesses correctly will receive a reward.

5. Students will now review the articles of clothing. The teacher will ask students to respond in the target language such as "Stand up if you are wearing a red shirt" for recognition of vocabulary. Other suggested questions are:

- **What color is the shirt?**
- **Do you like the shoes?**
- **What color are the shoes?**

6. Students will be assigned a task to bring in a picture of their favorite outfit. They will use the picture the following day, working in groups of three assigned by the teacher. Each group will be given three to four minutes to write as many sentences as they can about the pictures using the target language being studied. The students will focus on correct grammatical structures and the use of colors and clothing in their descriptions.

7. Students will be given a worksheet that will review vocabulary and go over important grammatical structures specific to the target language being studied.

(Vocabulary may vary depending upon the language being taught and the relevance of the necessary vocabulary needed to perform the task.)

Lesson Two

Interview with Sales Associate

Advance information for Sales Associate or Manager to be interviewed
The agenda for the interview has four parts:

1. Personal career information.
2. Personal experiences and anecdotes about communicating with customers who are not proficient in the English language.
3. Suggestions for basic questions that the students might use in their skit that would be authentic.
4. Show any materials that might be helpful; for example, forms or forms in the other language

Describe the sales advertisement and the skit the students will be doing. Ask the person to give a brief personal history of how he became interested in retail. What process did they go through when trying to make a career choice? Ask the person about personal experiences with customers who are limited in their use of the English language. If he does not have any personal experiences, ask him to inquire of his colleagues. What are some of the strategies that he uses to communicate? Are there special flyers or information printed in other languages? Are employees specifically hired to help those customers who may be limited in their use of English? Ask if he has any extra documents that he could bring that would be helpful for the students to see. Ask the speaker to inform students of the correct way to address customers who come with a different cultural background.

Preparing the Students for the Interview

Students need to be informed about the person who will be doing the presentation. Give them the preparation form from the Resources section and inform the students of your expectations of them.

1. Listen and take notes. There will be a reflection sheet to complete about the interview.
2. Prepare at least three questions for the person. The questions can be about the career or information they may need for their skit.

Day of the Interview

1. Introduce the speaker. Ask the person to begin by giving a career description. After the information is given, ask for questions from the students before moving on to the next question.

2. When the speaker is finished, have a student thank the individual for coming and give a small token of appreciation. Another student will later be asked to volunteer to write a thank you note.

3. Depending on how much time remains, the students should complete the reflection form in class or complete for homework and turn in the next day. The students should keep separate notes for themselves that are not to be turned in, for future reference for the skit.

FOREIGN LANGUAGE: SALES ASSOCIATE PROJECT

Lesson Three

A. Cultural Awareness

Teacher Preparation

The teacher will collect inserts from the Sunday newspaper to bring in as examples of a sales advertisement for a department store. The teacher will show students the components of a sales advertisement and give students the guidelines for the assignment. Students will be encouraged to use magazines for pictures and also Web sites so that they may access information about current trends in fashion from the target language country being studied. See the Resources section for Web sites.

Mount the advertisements on poster board for better visibility. Poster boards should be divided into sections to represent the different departments within a department store. Each member of the group will be responsible for creating their own department such as: children's, men's, and women's. Each department advertisement will have the articles of clothing correctly labeled including color, name of clothing, and price.

In Class

1. The teacher will teach a lesson on how to convert American dollars to the foreign currency of the target languages he is studying.

2. The students will be assigned to the groups that they will be in for the skit that will later take place. Students will then decide what department each group member will be responsible for developing. Each department will have articles of clothing correctly labeled in the target language including color and the cost.

3. Working in the same groups, students will develop a planned presentation using basic vocabulary of colors, clothing, and necessary retail phrases. The teacher will act as a customer and the group members will act as the sales associate and perform a mock sale. Student will be responsible for their departments. They will show at least three different outfits to the customer using basic Stage One vocabulary.

- **May I help you?**
- **Do you like the red shirt and blue pants?**
- **What size do you need?**
- **It costs....**
- **Thank you, come again**

B. Sales Advertisement

Teacher Preparation

The Resources section contains Web sites of places to obtain cultural information for various foreign languages and their countries where the language is spoken. A sales advertisement evaluation form is also in this section.

Introduction

Show students the sales advertisements that you have created and mounted on poster board for better visibility. Each different poster contains a different department:

- Children's department
- Men's department
- Women's department

Discuss what makes a good sales advertisement and what the purpose of the sales advertisement will be in connection to the skit.

GIVE STUDENTS THE CRITERIA AND DUE DATES FOR THE SALES ADVERTISEMENT.

Suggested Sales Advertisement Criteria

- Sales advertisement must be written in grammatically correct target language
- Sales advertisement will have culturally appropriate content
- Sales advertisement must be well designed, and have color
- Sales advertisement must have appropriate visuals (photos or drawings of clothing)
- Sales advertisement must have each article of clothing correctly labeled in the target language and include the color and cost
- Sales advertisement must be completed on time

Suggested Timeline

1. Each member of the group will produce a sales advertisement for their department.
2. A rough draft of the sales advertisement will be due in two to three days after assignment has started. (The teacher will review and return rough draft to student.)
3. Final sales advertisement is due the day of the assignment.

C. The Sales Skit

The Sales Skit for Students

Students will be putting together a mock sale for a local department store. Students will put together a team of three sales associates who will successfully execute a mock sale in the target language being studied.
To prepare for the mock sale, students will:

- **Research Internet department stores in the target country**
- **Prepare visuals to support the mock sale**
- **Include at least three different outfits varying in color and style for each department represented in the mock sale (men's department, women's department and children's department)**
- **Create a script for the mock sale**
- **Work in a group of three and determine which department each person will work in and which vocabulary will be necessary to use**
- **Interview local sales associates and/or managers to obtain a better understanding of useful phrases and requirements of a sales associate**

THE PRODUCT OF THE RESEARCH WILL BE A MOCK SALE THAT WILL BE PRESENTED IN FRONT OF THE CLASS. TEACHER WILL ACT AS THE CUSTOMER AND STUDENTS WILL ACT AS SALES ASSOCIATES USING A WRITTEN SCRIPT AND SUPPORTING VISUALS.

Teacher Preparation

The teacher can obtain information about department stores in the target country via the Internet and magazines. The teacher may also obtain useful information about sales associates job descriptions by speaking with local department store associates and/or managers. Students can discuss the similarities and the differences of the two department stores. Students will then need to be placed in groups of three students.

Student Preparation

Each group will contain three students. Students will then be responsible for their own departments.
The departments that students will need to represent in the skit are as follows:

- **Men's Department**
- **Women's Department**
- **Children's Department**

Each department will contain visuals to support their mock sale. Some of the recommended visuals include:

- **At least three different outfits varying in color and style**
- **Sales brochure to accompany skit**

The customer (the teacher) will go from department to department purchasing an outfit and students will be responsible for executing a successful sale in the target language. Students will need to know the necessary sales phrases such as, "What size? What color? Do you like___________? May I help you? Thank you."

Format

Skits will be performed in front of the class. Another student in the class may videotape them since the teacher will also be participating in the skits.

Information Sources

Students will use the Internet to search for Web sites of target language newspapers and magazines for appropriate material, information, and visuals. Students may also make use of local newspapers and magazines for pictures and information to be used.

Target language newspapers and magazines are available at some newsstands and provide information.

Script

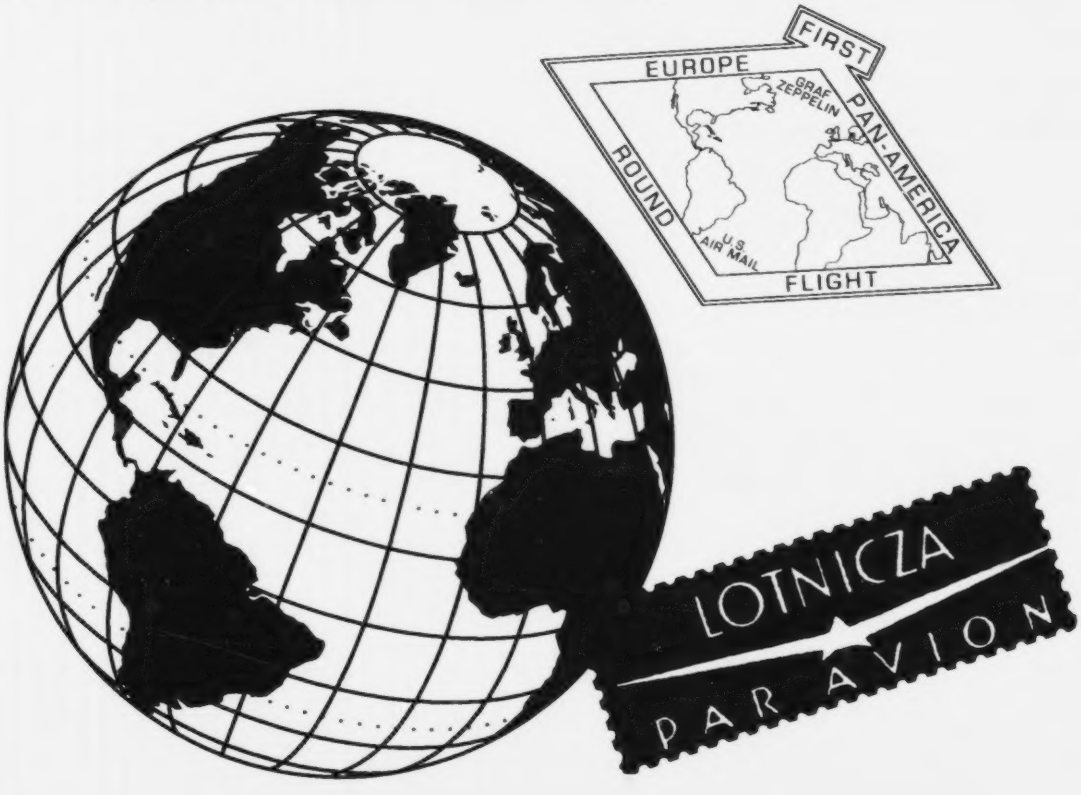
The script needs to be developed, written, and reviewed by the teacher before the skit is performed. This will ensure that groups are properly prepared. It also allows for an individual assessment of the knowledge of the grammar and vocabulary being stressed.

Assessment

Include students with the development of the rubric to be used to grade the skit. The teacher will need to include the objectives and competencies to be reached. A sample rubric is located in the Resources section.

Following the skit performance, ask the students for positive remarks about the skit. Any negative remarks will be relayed in the written rubric.

When all the skits have been completed, the students should complete the reflection form and a self and peer evaluation. Sample forms are located in the Resources section.



Resources

LUFTPOST
PAR AVION VIA AEREA
1674
EAGLE MIKADO No 2
EAGLE PENCIL CO. NEW YORK U.S.A.

The Sales Advertisement Evaluation Form

Name ______________________ Date Due______________

Date Received____________

Group Members ____

Sales Advertisement Criteria: Five points for each

________ 1. Sales advertisement was written in grammatically correct target language.

________ 2. Sales advertisement contained culturally appropriate material.

________ 3. Sales advertisement was well designed and had color.

________ 4. Sales advertisement had appropriate visuals (photos or drawings of clothing).

________ 5. Sales advertisement had each article of clothing correctly labeled in the target language and included colors and cost.

________ 6. Sales advertisement was completed on time.

Rough Draft Grade ______________

Final Draft Grade ________________

(Rough draft grade can be replaced by the final draft grade when the sales advertisement is completed.)

Interview Preparation and Reflection Form

Your name: ______________________ Your group: ______________

Guest speaker's name: ______________________ Place of employment: __________

Date of interview: __________

Your questions for the guest:

1. ____
2. ____
3. ____

(Take notes on separate paper & answer these questions at the end of the interview.)

Reflections:

1. What did you learn about the guest speaker's career?

2. What did you learn about the retail industry and communicating in languages other than English?

3. What did you learn to help you with your sales advertisement and/or sales skit?

4. Other comments or observations:

Self and Peer Evaluation Form

Group: ______________________

1. Give a grade.

A. Your Name: ____________
Part in mock sale: ____________
Your grade: ____________

Evaluate the people you worked with:

B. Name: ________________
Part in mock sale: ____________
Grade: ________________

C. Name: ________________
Part in mock sale: ____________
Grade: ________________

2. What was successful in your script?

3. What was successful in your presentation?

4. What did you learn from this experience?

5. What other group's presentation did you find well done?

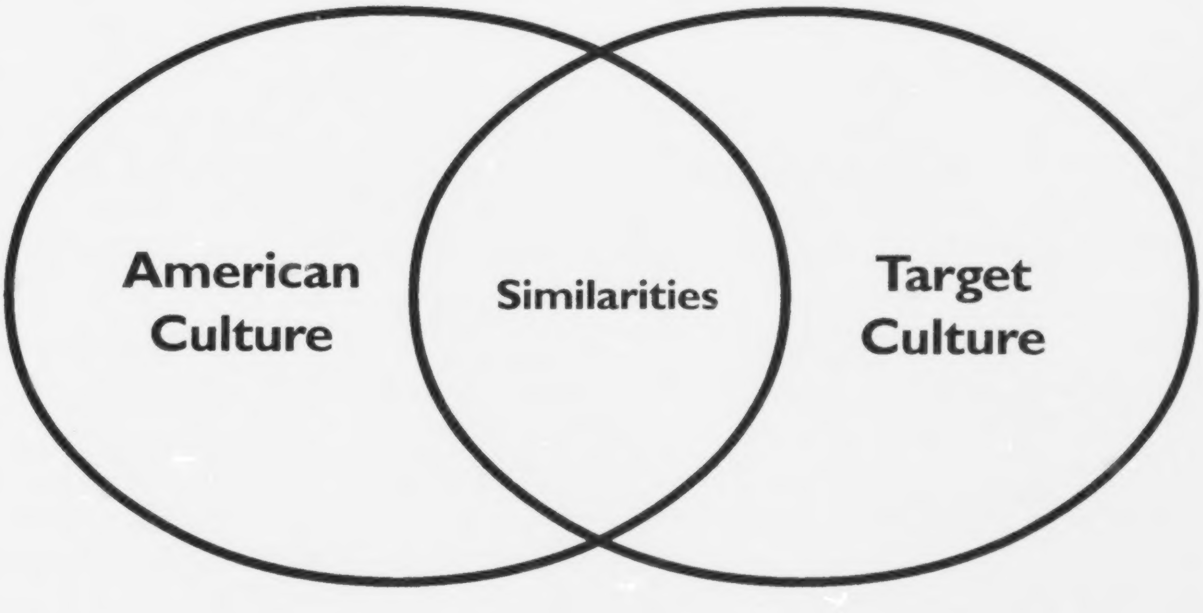
Sales Skit Rubric

Date: ________ Names of Students ________________

Teacher or peer assessor ____________ Point Total________

	Comprehensibility & Content Preparation	Effort & Fluency	Quality	Vocabulary	Visuals
Excellent **9-10**	Thoroughly prepared with interesting and pertinent detail. • Could be understood by a native speaker.	Strong attempt at more complicated structures and sentences. • Articulate,flowing speech. Good transitions to other sales associates.	Few or no grammatical errors. • Good intonation and largely accurate pronunciation with slight accent.	Extensive use of vocabulary, including idiomatic expressions.	Visuals clearly support the sales scenario. • Shows originality. • Well designed and can be clearly viewed.
Good **7-8**	Showed preparation with sufficient detail. • May not be grammatically perfect but could be understood by a native speaker.	Some attempt at more complicated sentences. • Some gaps in conversation. • Inconsistent transitions to other sales associates.	Minor grammatical errors. • Acceptable intonation and pronunciation with distinctive English accent.	Adequate use of vocabulary and idiomatic expressions.	Visuals support the sales scenario. • Shows some originality. • Design is adequate, but may not be appropriate for easy viewing.
Fair **5-6**	Some preparation. • Native speaker would have difficulty understanding.	Relies on simple sentences and structures. • Unnatural hesitations. • Awkward or forgotten transitions to other sales associates.	Some serious (missing) grammatical errors. • Errors in intonation and pronunciation with heavy English accent.	Limited vocabulary marked with some Americanized words.	Visuals do not support the issue effectively. • Shows no originality. • Cannot be clearly viewed.
Needs Improvement **3-4**	Limited preparation. • Native speaker would not be able to understand.	Limited grammatical structures. • Long, lost hesitations. • Many forgotten transitions.	Serious (missing) grammatical errors. • Errors in intonation and pronunciation that interfere with listener's comprehension.	Limited vocabulary marked by frequent Americanized words that force interpretation by the listener.	Visuals are a last minute attempt. • It is difficult to see and shows little preparation.
	Points____x2 =_____	**Points____x2=______**	**Points____x2=______**	**Points____x2=______**	**Points____x2=______**

Venn Diagram for Use in Comparison of Current Fashion



Web Sites

Center for the Advancement of Language Learning links to foreign language newspapers.
http://www.call.gov/

FLTEACH contains an index to many Foreign Language resources.
http://www.cortland.edu/flteach/flteach.html

Foreign Language Resources on the Web offers a starting point for searching for FL and culture-specific resources.
http://www.itp.berkeley.edu/-thome/HumanResources.html

GlobeGate is created to provide a centralized Internet resource for teachers of Foreign Language. They have indexed several thousand Web pages in various foreign languages.
http://globegate.utm.edu

The Human Language Page is a virtual library of languages with many links.
http://www.june29.com//HLP/

Multilingual Links provides links to resource sites for many languages and contains a search engine that connects to Alta Vista.
http://www.multiliguals.com.au/links.html

Tennessee Bob's Famous French Links! connects to the best French Web sites.
http://www.utm.edu/departments/french/french.html

The University of Toledo hotlist of web sites in French, Spanish, German, Russian, and Japanese.
http://www.forlang.utoledo.edu/BOOKMARK/Bookmark.html

Project Highlights

Instructional Topic	Chemical Weapons Inspection: An Integrated Learning Unit in Chemistry, English, and History
Grade Level	Grades nine through twelve
Time	Three weeks

Overview

This interdisciplinary project draws on chemistry, English, and history to produce a simulation of a chemical weapons attack on a cruise ship. The first part of the project provides background on the history of chemical weapons, the Persian Gulf War, and laboratory techniques for analyzing suspected chemical weapons agents. The second part of the project allows students to apply their research knowledge to a simulated chemical weapons attack. Students play the roles of ten interested parties in the attack, develop plans for responding to the attack, and present their plans to the United Nations Security Council. The final presentations are made to an audience of real community leaders playing the role of Security Council members.

Major Objectives

Ohio Competency-Based Standards

CHEMISTRY

- Conduct theory-based research using observational instruments and other methods
- Explore discrepant events and develop and test explanations of what was observed
- Modify personal opinions, interpretations, explanations, and conclusions based on new information
- Formulate an experimental design to test a given hypothesis
- Access appropriate technology to perform complicated, time-consuming tasks
- Work as a contributing member of a collaborative group
- Use technology to communicate scientific ideas
- Respect the scientific thinking of others and self
- Develop possible courses of action in response to scientific issues of local and global concern
- Create products, make inferences, draw conclusions using databases and other technology

LANGUAGE ARTS English

- Read as a possible problem solving strategy to clarify personal thinking and understanding
- Use the reading process to facilitate learning across the curriculum
- Use the reading process to develop an awareness of the need for human rights and freedom
- Value the thinking and language of others and self
- Synthesize information from a variety of sources
- Refine word choice and tone according to audience, situation, and purpose
- Appropriately cite information gained from primary and secondary sources
- Evaluate, analyze, and synthesize information for writing
- Enhance the use of critical thinking skills to evaluate media and oral presentations
- Be involved in individual, small-group, and whole-group listening and viewing activities
- Refine speaking techniques for formal, semiformal, and informal settings
- Develop a repertoire of organizational strategies for presenting information orally
- Prepare a formal speech/presentation
- Participate actively in a community of learners

SOCIAL STUDIES U.S. History and World Studies

- Examine historical situations and convey an understanding of key concepts in international relations
- Analyze diplomatic and military efforts to preserve world peace and advance national interests
- Locate sites of current events and identify reasons for the events occurring at those sites
- Cite historical examples and gauge the extent to which regions and nations have been dependent on other regions and nations
- Discuss how activities of government impact economic activity
- Examine the impact events in one market may have on other markets and the interdependence of markets

ITAC Core Competencies

1.1 Solve problems and make decisions in work-related situations
1.2 Read for information and understanding
1.6 Apply statistical analysis skills
1.7 Analyze critical data to guide work activities
1.8 Utilize scheduling and cooperating learning techniques to ensure that jobs are completed by stated due date
1.10 Demonstrate knowledge of the economy as a framework within which decisions are made by individuals and groups
2.1 Apply basic communication skills
2.2 Apply oral communication skills
2.3 Apply written communication skills
2.4 Apply technical writing skills to express complex ideas and concepts
2.5 Apply listening skills to enhance communications(s)
2.6 Apply demonstration/presentation skills
2.9 Convey information through multimedia presentation
2.11 Build interpersonal relationships
3.1 Demonstrate technological literacy
3.2 Use electronic communication systems
3.3 Demonstrate computer literacy
3.4 Use spreadsheets to accomplish a variety of purposes
3.6 Use word-processing software to accomplish a variety of purposes
4.1 Demonstrate leadership
4.2 Contribute to teamwork
4.3 Choose ethical courses of action in all work assignments and personal interactions
4.4 Demonstrate work ethic
4.6 Demonstrate appropriate behaviors for dealing with the differences associated with diversity in racial, ethnic, gender, educational, personality, social, and age issues
5.4 Demonstrate skills needed to enter or re-enter the workforce
5.5 Demonstrate job-keeping skills
6.1 Demonstrate self-management process in the workplace
6.2 Use reference materials to obtain information appropriate to a given problem
6.7 Manage work and family responsibilities for the well being of self and others
6.8 Determine resources needed to produce a given product or provide a service

Performance Objective

Demonstrate the ability to apply concepts from chemistry, English, and history to:

1. Submit findings in the form of a military brief.
2. Develop and present a crisis response plan to the United Nations Security Council.

Preparatory Information for Teachers/ Materials Needed

1. Students will need access to computers, the Internet, and PowerPoint or similar presentation software.
2. Students will need access to a chemistry lab and unknown substances to analyze.
3. Guest lecturers on the use of chemical weapons and preparation of military briefs will need to be scheduled.
4. The format for a military brief along with many kinds of information about chemical weapons appears in Lesson One.

Career Task Scenario

A chemical attack by unknown terrorists occurred recently on a cruise ship docked in San Juan, Puerto Rico. Chemical agents used in the attack have been linked to Iraq, which has engaged in the manufacture of chemical weapons. Documentation, compiled by a United Nations Chemical Weapons Inspection Team, provides evidence of this fact.

The following organizations have very special concerns about the outcome of this situation. Your team has been assigned to represent one of these groups.

Career Task Scenario *(continued)*

Special Interest Groups:

United States Government

Organization of Petroleum Exporting Countries (OPEC)

Arab League

World Trade Organization

Human Rights Watch

Greenpeace

European Union

North Atlantic Treaty Organization (NATO)

Government of Iraq

Cruise Lines International Association

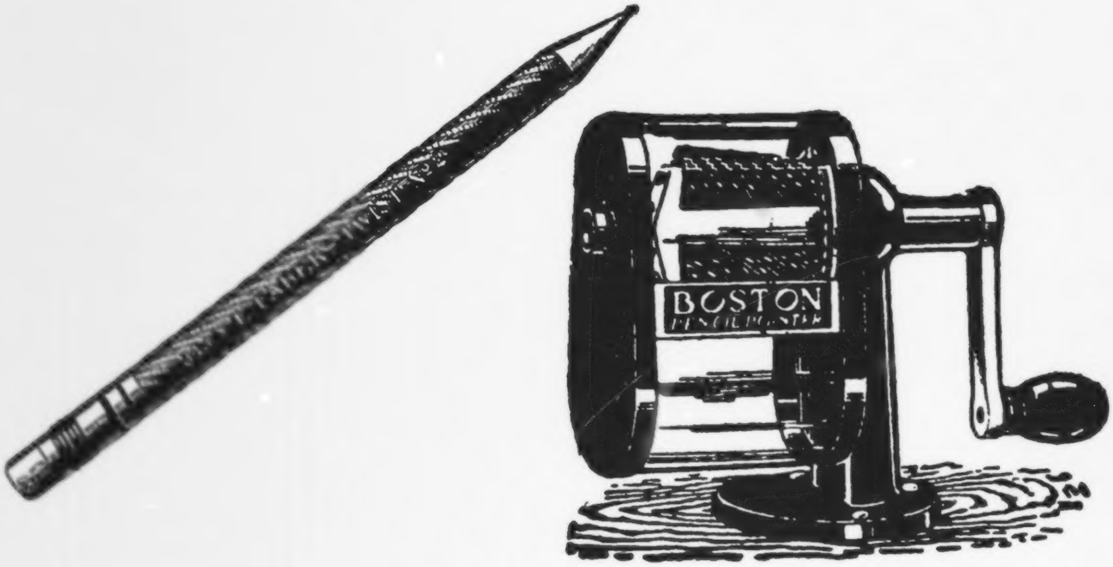
Guiding Questions

1. What is your purpose, goal or agenda?
2. Does the situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

Assessments

Lesson One: A Military Brief Evaluation Rubric is available in the "Resources" section of this unit.

Lesson Two: An Oral Presentation Rubric is available in the "Resources" section of this unit.



PROJECT TIMELINE

DAY	PLACE	CHEMISTRY	ENGLISH	HISTORY	HANDOUTS
	Individual Classroom	Instruction was given in origin of biological weapons, how to perform analysis of unknowns.			
1	Individual Classroom	Lab analysis of five suspected weapons sites was performed.			
	Double Rms.		Project was explained. Research aspect of project was assigned.		Requirement for Military Brief, Helpful Websites
	FIC/Library		Students researched history of chemical/ biological weapons in general and specifically those used by Iraq.		
2	Double Rms. FIC/Library	Students were divided into ten groups of six/seven, after which they divided the assignment into three tasks (research, lab analysis, writing of glossary) and began their individual work on the project.			
3	Double Rms. FIC/Library	Guest lecturers from Air Force made a one-hour presentation on use of chemical weapons and military briefings. Students spent two periods completing their research and writing briefs.			Format for Military Brief, Bibliographical Information and Samples
4	Individual Classroom	Students confirmed lab results.			
	Double Rms.		Students spent two periods writing/editing military briefs.		
5	Double Rms.	Teams worked on completing their research and writing their military briefs.			
6	Double Rms.	Students were given ten minutes to collate and hand in their briefs. A video of a simulated chemical weapons attack in Puerto Rico was shown. Handouts on types of evidence, presentation skills, recommendations for special interest group actions were distributed. The Technology Coordinator instructed the students in how to make PowerPoint presentations			Chemical Weapons Scenario Interest Groups, Chemical Weapons Crisis Special Interest Groups Advocacy, How to Persuade the UN Security Council to Adopt your Plan, plus first ten Resources handouts
7	Individual Classroom	Regular chemistry class instruction (cont.)			
	FIC/Library		Teams researched information about their special interest group.		
8	Individual Classroom	Groups 1 -3 did regular chemistry work.			
	Double Rms.		Groups 4 - 10 worked on Powerpoint presentation.		
9	FIC/Library	Students finished research and Powerpoint presentation.			
10	Double Rms.	Students rehearsed their presentations before all three team teachers and modified according to feedback.			
11	Double Rms	Teams made presentations to panel of ten community leaders.			

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INTERDISCIPLINARY: CHEMICAL WEAPONS INSPECTION

Lesson One

Informational Requirements for Military Brief

You are a member of a United Nations Chemical Weapons Inspection Team. Your team has been granted access to suspected weapons sites in Iraq.

Your task is to submit your findings to the United Nations Security Council in a military brief.

The military brief will include the following components: *[Follow standard lab format.]*

I. A Historical Context for the Investigation
  A. History of Chemical Warfare [one page]
  B. Iraqi Use of Chemical Weapons Prior to the Persian Gulf War [one page]
  C. Persian Gulf War (1991) [two to three pages]
    1. Causes
    2. Course of the War
    3. Outcome Including U.N. Resolution 687

II. Laboratory Experience
  A. Glossary of Chemical Weapons [one page spreadsheet]
    1. Types of Weapons
    2. Dangers of Weapons
    3. Uses of Weapons
  B. Laboratory Analysis of Unknown Components

Helpful Web Sites

Iraqi Weapons
http://www.washingtoninstitute.org/watch/Policywatch/policywatch1998/301.htm
http://usinfo.state.gov/
http://www.nci.org/ib21998.htm
http://www.chronicillnet.org/PGWS/Tuite/science2.html

History of Chemical Warfare
http://www.anl.gov/OPA/news97/news970916.html
http://www.stimson.org/cwc/
http://www.state.gov/www/global/arms/bureau_ac/wmd_ac.html
http://www.amasys.com/wmd.htm

Persian Gulf Conflict
http://www.cfcsc.dnd.ca/links/milhist/gw.html
http://www.naplesnews.com/special/reports/iraq/cruise/index.html
http://members.aol.com/firetruth/PersianGulf.htm
http://www.chronicillnet.org/PGWS/Tuite/science2.html
http://www.desert-storm.com/

Iraqi Use of Chemical Weapons Prior to the Persian Gulf Conflict
http://www.fas.org/irp/gulf/cia/960702/72566_01.htm
http://cbw.grmbl.com/iraq/cwcap.htm
http://www.fas.org/news/iraq/1994/index.html
http://www.kdp.pp.se/ara/index.html

International Organizations
http://www.isn.ethz.ch/linkslib/

Format for Military Brief

Cover Page

This page will include the title, Biological and Chemical Weapons Inspection in Iraq, and the names of the group members.

Page One

Bullet Background Paper

On this page you will write a basic outline *(using bullets instead of Roman numerals)* of the major topics in your paper.

Body of Paper

Begin each topic with a paragraph of explanation about the topic. The explanation could include a brief history, a definition, a description, etc. *(This is the introduction.)*

The rest of the page should include the details, facts, descriptions, etc. required by the topic. *(This is the support.)*

Finish the topic with a conclusion that follows logically from the information.

Your paper should include graphics that help make your information clearer, more interesting, more relevant. For example, you may use a timeline for the history of chemical warfare part, but you must make sure you also include a narrative explanation of the time line.

For the glossary of chemical weapons, you might want to consider using a chart or table to display your information.

Mechanics

Your paper must:

1. Be typed.
2. Have numbered pages.
3. Include a bibliography, which will be the last page. This page will be the documentation of all the sources you used in writing your paper. See Mrs. Bourne for informational sheets on how to write the documentation if you need help. (Some of you may still have them from the beginning of the year.)
4. Include one composite lab report and all the individual reports of your group members.
5. Be edited for MUGS (mechanics, usage, grammer and spelling), organization, neatness, completeness.

Bibliographical Information and Samples

Adapted from MLA Handbook for Writers of Research Papers

For Printed Material

Book
1. Bernstein, Barry. *Literature and Language*. Evanston, Illinois: McDougal, Littel & Company, 1992.

Newspaper
2. Kumar, Kavita. "Bridges: Silent Crisis." *Dayton Daily News* 30 Aug. 1998: 1A.

Magazine
3. "Frequent Flyer Games." *Consumer Reports* July 1998: 45.

Television Show
4. "Frederick Douglass." *Civil War Journal*. Narr. Danny Glover. Dir. Craig Haffner. Arts and Entertainment Network. 6 Apr. 1993.

Government Pamphlet
5. Dept. of Labor. *Child Care: A Workforce Issue*. Washington: GPO, 1988.

Reference Book
6. "Ginsburg, Ruth Bader." *Who's Who in America*. 48th ed. 1994.

For Online Material

1. **Name of the author (if given)**
2. **Title of the article or document (in quotation marks)**
3. **Title of the journal, newsletter, or conference (underlined)**
4. **Volume number, issue number, or other identifying number**
5. **Year or date of publication**
6. **Publication medium (Online)**
8. **Name of the computer network**
9. **Date of access and URL (Online address)**

An article in a online newspaper
"Endangered Species Act Upheld." AP Online 22 June 1998.
<http://www.nytimes.come/aponline/w/AP-Court-Endangered-Species.html>.

An article in an online magazine
Guckenberger, Katherine. "A Convent with a View." Atlantic Unbound 22 Jan. 1998
<http://www.theAtlantic.com/atlantic/unbound/abroad/kg980122.htm>.

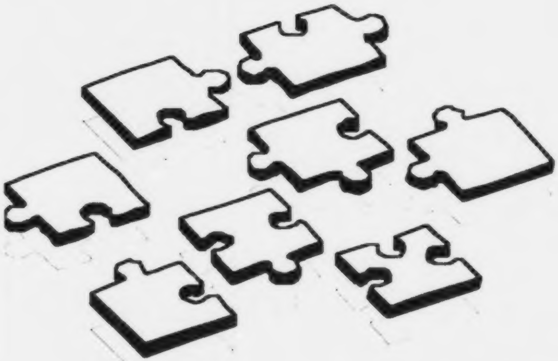
An anonymous article
"Fleeting Consciousness." US News Online 29 June 1998.
<http://www.usnews.com/usnews/issue/980629/29brai.htm>.

**If you must break the online address, do so only after a slash line.*

***For resources other than those listed above, please refer to the MLA Handbook*

SIX-POINT PROBLEM SOLVING

1. Define the problem in terms of each person's (group's) needs.
2. Restate the problem in such a way as to include each person's (group's) needs.
3. Brainstorm alternative solutions.
4. Evaluate these solutions.
5. Decide on the best solution acceptable to all.
6. Later, at a time agreed upon, evaluate how it is working.



Lesson Two

Chemical Weapons Crisis: Special Interest Groups Advocacy

Assignment

You are members of a special interest group* (see handout, which names and describes your group) alarmed about the recent terrorist attack in Puerto Rico. You know that the chemical agent used in the attack is the same one found by a U.N. Inspection Team in Iraq. This attack has serious repercussions for your organization. Having received permission to speak before the U.N. Security Council, your task is to:

1. Determine what your group's position is with respect to the attack.
2. Develop a plan for responding to the attack (See "Possible Recommendations for Action" below).
3. Present your plan to the United Nations Security Council.

Purpose

The purpose of your presentation is to persuade the Security Council panel to vote in favor of your plan.

Possible Recommendations for Action:

1. Air strike against chemical weapons site in Iraq.
2. No action which might threaten Arab sovereignty.
3. No action which might pose a threat to civilians.
4. No action which might threaten the earth.
5. Strong stand against terrorist activity.
6. Economic actions against Iraq.
7. Freeze on Iraqi assets.
8. Travel restrictions on Iraqi air travel.
9. Acceptance of responsibility.
10. Financial compensation for victims.

Special Interest Group Advocacy or How to Persuade the U.N. Security Council to Adopt Your Plan

Presentation Components

Your presentation should include the following:

1. A brief introduction of your organization and its special interest in this crisis.
2. A concise statement of your position with respect to the crisis.
3. Evidence supporting your position.
4. An outline of your plan for responding to the crisis.

*See *Resources section for interest group handouts*

Presentation Preparation

Complete the following steps for preparing your presentation:

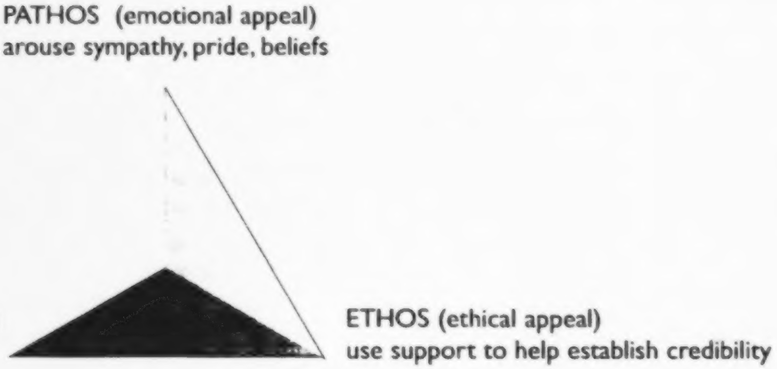
1. Research additional information about your special interest group and determine what your position is.
2. Understand your audience (U.N. Security Council): What is their interest? What evidence is likely to be effective for this audience? What language will appeal to them? What objections might they have to your position and/or plan?
3. Discover some common ground, i.e., some information, values, purposes, etc. that your group shares with the U.N. Security Council (your audience).
4. Develop your plan (recommendations for the best response to the attack).
5. Gather evidence to support your plan.

Guidelines for Types and Forms of Evidence

You may use any or all of the following types of evidence:

- Factual knowledge, including statistics
- Personal testimonies/case histories/informed opinions
- Documented histories
- Surveys
- Graphic displays: charts, maps, photographs
- Audio/video tapes
- Samples (of soil, air, earth, personal items, etc.)
- Reasoning: inferences, interpretation of facts, logical conclusions
- Logical, emotional, ethical appeals (See illustration below.)

Aristotle's Effective Reasoning


PATHOS (emotional appeal)
arouse sympathy, pride, beliefs
LOGOS (logical appeal)
use sound reasoning
ETHOS (ethical appeal)
use support to help establish credibility

Guidelines for Presentation

- Dress appropriately for the seriousness of the presentation
- Have audio/visual materials organized and ready for use
- Greet panel members
- Introduce your group members and give a brief description of your organization
- State your position in one sentence
- Relate the common ground you have with the panel
- Explain your plan, presenting several sides of the argument
- Relate your evidence
- Practice good presentation skills. (See next page.)

Mrs. Bourne's Magic Formula for Good Speeches

Verbal

Use good breath control, speak clearly, and enunciate.

Speak with an Open Moving Mouth (OMM)

- to allow the breath a clear passage for sound
- to develop vocal richness and avoid nasality
- to prepare the articulators (tongue, teeth, and lips) for the proper enunciation of all the consonant sounds
- to increase the volume

Exaggerate your words slightly. Most people increase their speech rate when they are nervous.

Lengthen the sounds of the internal vowels (this is called duration) as a way to slow yourself down.

Body Movement

For good posture:
Start with a military posture (feet together, shoulders straight and back, head up, arms straight at your sides).

From the military position, move your feet to shoulder width apart, relax your shoulders and back slightly, and let your arms hang in a relaxed fashion from your shoulders.

Other strategies:
Always move from the center (waist) of your body.

Keep your feet shoulder width apart for good balance. You may place one foot slightly in front of the other.

Use your hands to reinforce your words:

- to direct
- to describe
- to illustrate
- to point out
- to emphasize

If you are not gesturing, then keep your hands quietly at your side. (Folding your hands behind your back is a better [but not the best] choice than letting them fly around or dangle loosely.)

Make eye contact with the members of your audience.

Choose the friendliest, most attentive listeners and/or the ones who give clear nonverbal feedback.

Make sure that you look at people in all parts of the room. Form an "M" with your eye contact to be aware of all parts.

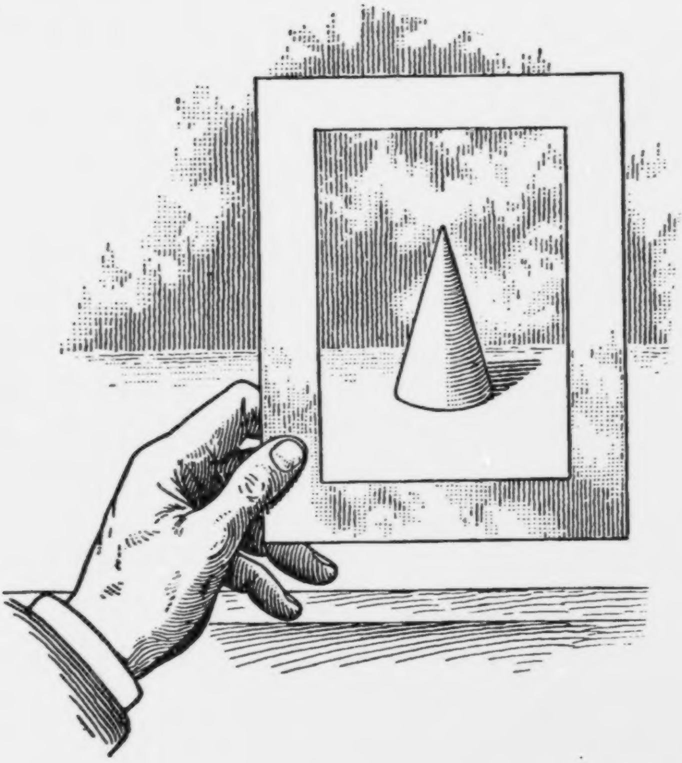
Be aware of your "room side" preference and adjust.

Show a friendly facial expression - smile. You are communicating with warm, sensitive, interested human beings, not performing for an audience.

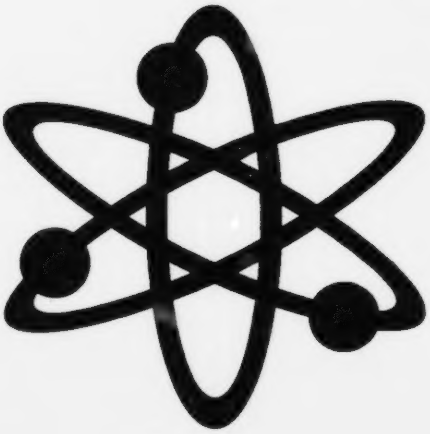
Include a purposeful walk (different from pacing), moving slightly toward your audience.

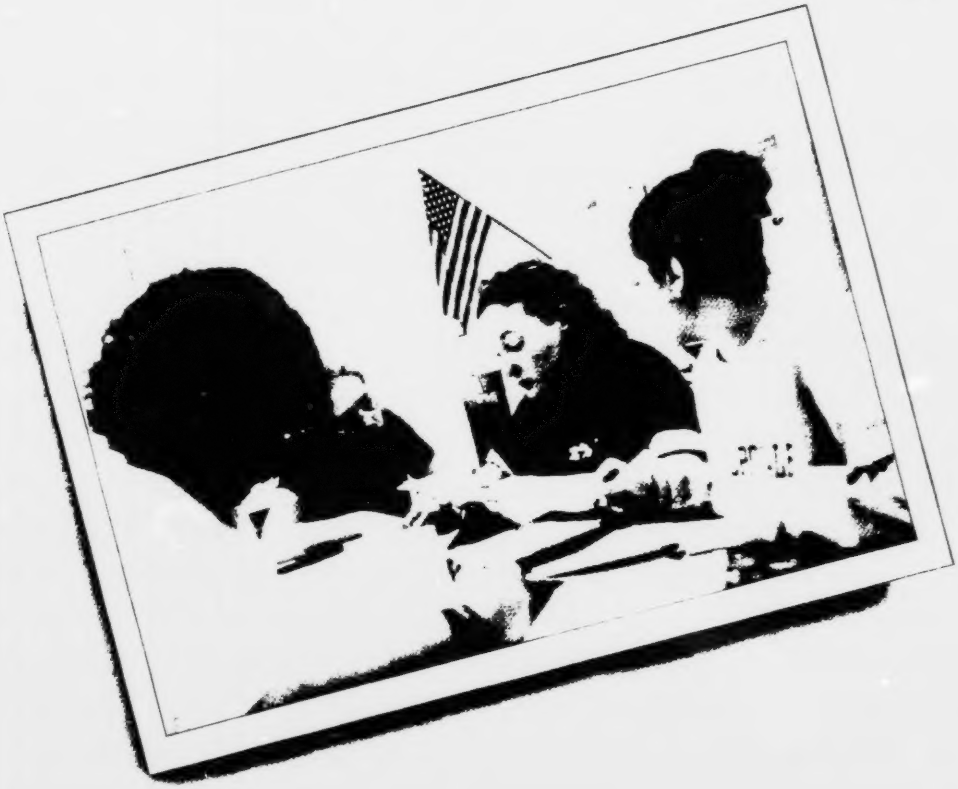
ABOVE ALL, KNOW YOUR SUBJECT MATTER AND GET GENUINELY CAUGHT UP IN YOUR TOPIC.
YOU WILL BE MUCH LESS SELF-CONSCIOUS AND MUCH MORE EFFECTIVE.
ENTHUSIASM IS CONTAGIOUS!

CHEMICAL WEAPONS BRIEF PROJECT
WITH TEAM I AT FAIRMONT



RESOURCES





United Nations Chemical Weapons Standard Test Results

The following are a list of standard test results for known chemical weapons in existence.

Chemical weapon	Test results *(number indicates a confirming chemical reaction occurred in the lab for site samples 1 through 5)*
1. Anthrax	5
2. Botulinum toxin (Botox)	1, 2, 4
3. VX	1
4. Mustard gas	1, 2
5. Sarin	1, 2, 3
6. Lewisite	2
7. Tabun	3, 4
8. Hydrogen cyanide	3, 4, 5
9. Carbonic dichloride	1, 2, 3, 4, 5
10. Ricin	1, 4
11. Gas gangrene	1, 5
12. Chlorine	2, 3, 4
13. Wheat smut	3
14. Tear gas	4, 5
15. Soman	3, 5

Chemistry I Laboratory Report Format

In Chemistry I emphasis is placed upon the writing of neat, concise, and well-organized laboratory reports. All reports may be written in pen or pencil and are due at the start of your class period one week from the date of completion of the experiment. Reports may be turned in at any time before the date due but NONE WILL BE ACCEPTED LATE. A one or two day absence during the interval between completing the lab and handing in the report will not be an excuse for a late report. A Chemistry I laboratory report consists of five main parts:

I. Purpose

Contains a statement, which explains the reason for doing the experiment, and usually begins with the word "to." Example: "To determine the molecular weight of sulfur..."

II. Procedure

This section should summarize the important activities done during the experiment. It should not contain the step by step procedure given on the handout. It should be concise and complete enough that a student could complete the experiment from your instructions. Example: "A 500 ml flask was taken and filled with distilled water. 20.0 grams of calcium carbonate was added to the water and the temperature recorded."

III. Data or Observation

Contains the information collected during the experiment. This section should be organized prior to performing the experiment. All data should be properly labeled and contain the correct number of significant figures. Example: "Mass of beaker: 45.32 grams, Mass of beaker and NaCl: 54.98 grams."

IV. Calculations

This section contains a sample for each type of calculation performed. All calculations should be properly rounded to the correct number of significant figures and properly labeled.
Example: moles of reagent= grams of reagent used/molecular weight of reagent; i.e. 16.0 grams of sulfur/32.0 grams of sulfur per mole= .500 moles of sulfur.
Once a single calculation of a type has been noted, all other similar calculations may be listed. Example: Moles of oxygen used= .345, moles of nickel used= .456 moles. Note that no mathematical steps are shown.

V. Conclusion

This last section should provide the answer to the problem which you attempted to solve. It is very important that it match the purpose. Example: "The molecular weight of sulfur was 256 grams." Sometimes there will be questions to answer. Be sure that these answers are complete and in good form. The question is never copied.

Laboratory reports are valued at a variable number of points depending on the amount of effort required to complete the report. Points are deducted for improper or incomplete procedures and purposes. Points are also deducted for problems with significant figures and labels in your data. Calculations are checked for accuracy as well as use of proper labels and significant figures. Conclusions and calculations are checked for accuracy. You are then given a single grade for the reports, such as 15/20. Lab reports usually take approximately one week to grade and will be returned to you when complete

Military Brief Evaluation Rubric

Names of Group Members:

	Excellent 5-4	Good 3-2	Inadequate 1-0	TOTAL
CHEMISTRY				
Accuracy of Lab Analysis				
Quality of Chemical Weapons Glossary				
ENGLISH				
Quality of Writing				
Accuracy and Completeness of Bibliography				
HISTORY				
Accuracy and Quality of Research				
Completeness of Information				

Comments:

News Bulletin For Chemical Weapons Crisis Scenario

A chemical attack by unknown terrorists occurred today in Puerto Rico aboard the Carnival Cruise ship, Fantasy. According to on-the-scene reporters, the cruise ship was docked in the port of San Juan just prior to departure for a weeklong recreational cruise to the Caribbean Islands. The number of casualties is unknown at this time. Puerto Rico's government has expressed outrage at this violation of their territorial sovereignty and has pledged to bring the perpetrators to justice. Due to its status as a commonwealth of the U.S., Puerto Rican officials have requested U.S. assistance in the investigation.

News Flash!

U.S. officials have determined that the chemical agent used in the attack is the same one found in a recent U.N. inspection team's findings in Iraq.

Time Lapse

In the ongoing investigation into the terrorist attack on the cruise ship, Fantasy, authorities have discovered that the suspects are Iraqi nationals with known ties to the government of Iraq. The number dead has now risen to 237, with 354 suffering from severe to mild symptoms. Symptoms include coughing, difficulty in breathing, increased perspiration, nausea, vomiting, colic, and diarrhea. If not treated, death by suffocation can occur. The chemical used in the attack has been identified as sarin, a weapon that is only being produced in Iraq. The United States has expressed outrage at the continued disregard for human life and territory that the Iraqis have demonstrated in this recent act of aggression and has vowed to seek justice in an emergency meeting of the U.N. Security Council on Monday, May 3rd.

INTEREST GROUP: THE UNITED STATES GOVERNMENT

The United States of America is a federal republic on the continent of North America, consisting of forty-eight contiguous states and the noncontiguous states of Alaska and Hawaii. Outlying areas include Puerto Rico, American Samoa, Guam, and the Virgin Islands of the United States. The forty-eight states are bounded on the north by Canada, on the east by the Atlantic Ocean, on the south by the Gulf of Mexico and Mexico, and on the west by the Pacific Ocean. New York City is the largest city in the United States and Washington D.C. is the capital. The total area of the United States is 9,666,861 square miles. The population of the United States according to the 1990 census is 248,709,873. The United States is a rich country in terms of natural resources. However, despite its wealth, the U.S. cannot produce all the resources needed by its large industrial economy. For example, the United States produces only 65% of the petroleum that the country consumes.

Questions to Consider

1. What is your purpose, agenda, or goal?
2. Does the situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

INTEREST GROUP: THE ARAB LEAGUE

The Arab League is an organization of twenty-one Middle Eastern and African nations, and the Palestine Liberation Organization. The Arab League's purpose, as stated in the Pact of the League of Arab States, is to promote closer political, economic, cultural, and social relations among the members. A council composed of representatives of the member states works to settle disputes peacefully. It can also decide by unanimous vote how to repel aggression against a member. Member states include Iraq, Saudi Arabia, Lebanon, Yemen, Jordan, Egypt, Syria, Libya, Sudan, Morocco, Tunisia, Kuwait, Algeria, Bahrain, Oman, Qatar, United Arab Emirates, Mauritania, Somalia, the PLO, Djibouti, and Comoros.

Questions to Consider

1. What is your purpose, agenda, or goal?
2. Does the situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

INTEREST GROUP: HUMAN RIGHTS WATCH

Human Rights Watch is an organization dedicated to protecting the human rights of all people around the world. The organization stands with victims and activists to prevent discrimination, to uphold political freedom, to protect people from inhumane conduct in wartime, and to bring offenders to justice. Members pledge to investigate and expose human rights violations and to hold abusers accountable. The organization challenges governments and those who hold power to end abusive practices and to respect international human rights law. Members seek to enlist the public and international community to support the cause of human rights for all.

Questions to Consider

1. What is your purpose, goal, or agenda?
2. Does the situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

INTEREST GROUP: EUROPEAN UNION

The European Union, sometimes called the EU, is an organization of fifteen Western European countries that promotes cooperation among its members. The members cooperate in many areas, including politics and economics. They have achieved the most success in creating a single economic market without internal barriers to trade and investment. The union's members are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. The headquarters of the European Union is in Brussels, Belgium.

Questions to Consider

1. What is your purpose, goal, or agenda?
2. Does the situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

INTEREST GROUP: ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES (OPEC)

OPEC is an association of twelve nations that depend heavily on oil exports for their incomes. Its members work together to try to increase their revenues from the sale of oil on the world market. OPEC members have three-fourths of the world's recoverable oil reserves. In the early 1990's, these countries produced more than half the oil traded internationally. The members of OPEC are Algeria, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

Questions to Consider

1. What is your purpose, goal, or agenda?
2. Does the present situation affect your interests?
3. How can you protect your interests?
4. What is your recommendation?

INTEREST GROUP: THE WORLD TRADE ORGANIZATION

The World Trade Organization is an international organization that deals with the global rules of trade between nations. The main function of the organization is to ensure that trade flows as smoothly, predictably, and freely as possible. The result is assurance; consumers and producers know that they can enjoy secure supplies and greater choice of the finished products, components, raw materials, and services that they use. Producers and exporters know that foreign markets will remain open to them. The result is also a more prosperous, peaceful, and accountable economic world. Decisions in the WTO are typically taken by consensus among all member countries and they are ratified by members' parliaments. Trade friction is channeled into the WTO's dispute settlement process where the focus is on interpreting agreements and commitments, and on ensuring that the countries' trade policies conform with them. That way, the risk of disputes spilling over into political or military conflict is reduced.

Questions to Consider

1. What is your purpose, goal, or agenda?

2. Does the situation affect your interests?

3. How can you protect your interests?

4. What is your recommendation?

INTEREST GROUP: GREENPEACE

Greenpeace is an international environmental organization. The organization works to change government and industrial policies that threaten the world's environment or natural resources. Greenpeace calls attention to the dangers to the environment of such actions as whaling, air and water pollution, offshore oil drilling, nuclear weapons testing, and the dumping of radioactive and hazardous wastes. Local chapters of Greenpeace have been established in major cities throughout the world. Members of Greenpeace use direct and nonviolent methods of protest. They go to the place where an activity is occurring that the group considers harmful. Without using force, they try to stop the activity. For example, to protest whaling, Greenpeace members in boats position themselves between whales and the whaling ships.

Questions to Consider

1. What is your purpose, goal, or agenda?

2. Does the situation affect your interests?

3. How can you protect your interests?

4. What is your recommendation?

INTEREST GROUP: NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO provides unified leadership for the common defense of nineteen member nations. NATO was established in 1949 by countries allied by the North Atlantic Treaty, which provided for a collective defense against a possible attack by the Soviet Union or any other aggressor. The treaty stipulates that an armed attack against one or more member nations in Europe or North America shall be considered an attack against all members. Twelve nations signed the North Atlantic Treaty in 1949 in Washington, D.C.: they were Belgium, Great Britain, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, and the United States. Greece and Turkey signed the treaty in 1951, West Germany in 1954, and Spain in 1982. West Germany had been created in 1949 when the nation of Germany was divided into West Germany and East Germany. In 1990, Germany was reunited and replaced West Germany as a NATO member. The newest members of NATO include the countries of Poland, Hungary, and the Czech Republic.

Questions to Consider

1. What is your purpose, goal, or agenda?

2. Does the situation affect your interests?

3. How can you protect your interests?

4. What is your recommendation?

INTEREST GROUP: THE GOVERNMENT OF IRAQ

Iraq is an Arab country at the head of the Persian Gulf in southwestern Asia. The country is bordered by Turkey, Iran, Kuwait, Saudi Arabia, Jordan, and Syria. Baghdad is Iraq's capital and largest city. Iraq became part of the Arab Empire in the A.D. 600's and absorbed Arab Muslim culture. Today, about 75% of Iraq's people are Arabs. Iraq also has a large Kurdish population that has struggled for self-government for many years. Iraq's economy depends heavily on the export of oil. Although Iraq's constitution states that the country is a republic, the country actually functions as a dictatorship. President Saddam Hussein and other leaders of the ruling Baath Party control all branches of the government.

Questions to Consider

1. What is your purpose, agenda, or goal?

2. Does the present situation affect your interests?

3. How can you protect your interests?

4. What is your recommendation?

INTEREST GROUP: CRUISE LINES INTERNATIONAL ASSOCIATION

For those curious about cruising, Cruise Lines International Association's web site – www.cruising.org – is the perfect place to stop and browse. Visitors to the site will discover the most up-to-date happenings in the cruise industry, a place to order CLIA's complimentary Cruise Vacation Planner, and the opportunity to find a local CLIA-affiliated travel agency to discuss booking a cruise vacation. Showcasing the comfort, adventure, romance, and value of a cruise vacation, Cruise Lines International Association's 1999 Cruise Vacation Planner reveals why cruising beats a landlocked vacation hands down. Geared toward first-time cruisers, the magazine features insights and viewpoints of professional travel journalists that will help them launch the best vacation ever. Cruise Lines International Association is a group dedicated to making cruise vacations enjoyable and affordable. This organization is also dedicated to the safety and security of the passengers and works with many different governments at various ports-of-call.

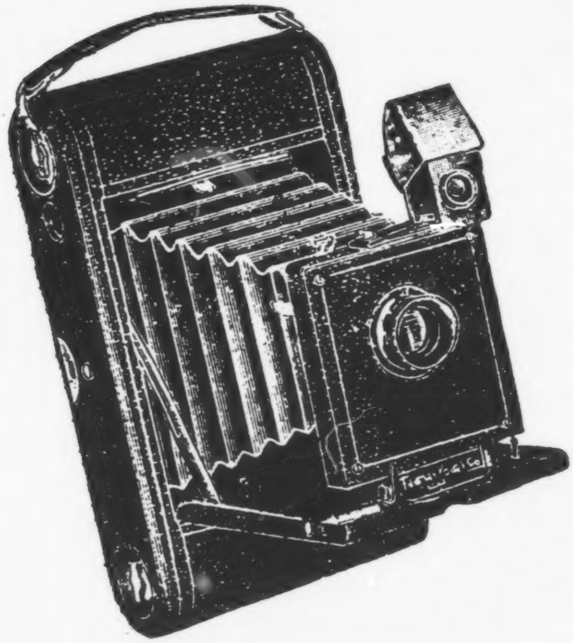
Questions to Consider

1. What is your purpose, agenda, or goal?

2. Does the situation affect your interests?

3. How can you protect your interests?

4. What is your recommendation?



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Sample Letter to Community Member

April 14, 1999

Dear:

Thank you so much for accepting Kettering Fairmont High School's Team 11 invitation to serve as a panel member for our Chemical Weapons Simulation Project.

The purpose of our project is to develop an integrated curriculum unit in the areas of chemistry, history, and English. In the first part of the project, students will role-play a U.N. chemical weapons inspection team investigating a suspected Iraqi chemical weapons site. In their role, students will:

- research the history of Iraq and its use of chemical weapons
- perform analyses of unknown chemicals
- write a glossary of chemical weapons and their dangers
- compile their information in a military brief

After the briefs have been submitted, the students will view a simulated news broadcast reporting a terrorist attack on Puerto Rico. Students will then role play members of special interest groups (United Arab League, NATO, environmentalists, humanitarians, oil producers, U.S. State Department, media specialists, and the armed forces) that respond to news of the attack by making role-relevant recommendations to a ten-member panel of the U.N. Security Council.

Your role as a panel member is to evaluate the students' presentations and recommendations.
The presentations will take place on May 3rd at 11:00 at Kettering Fairmont High School, West Unit, Rooms 347-9. At that time you will be provided with guidelines for evaluating the presentations.
Your participation in this project not only enhances our students' learning but also provides a very important sense of community connection for them. Thank you for accepting this invitation.

Sincerely,

Team 11: Carol Bourne Nancy Ingram Dan Von Handorf

Presentation Rubric

Evaluator____________________

Special Interest Group: United States Government

Put a number in the box that best reflects the criterion being evaluated.
The total number of points possible is 50.

	Outstanding 10-7	**Good 6-3**	**Needs Work 2-0**
Evidence of Preparedness			
Persuasive Arguments and Evidence			
Creative and Reasonable Recommendations			
Effective Presentation Skills			
Effective Use of PowerPoint			

Column Total

Presentation Total: __________ **/50**

Additional Comments

INTERDISCIPLINARY: LAND USE

Project Highlights

Instructional Topic	Towpath Trail Land Use Project
Grade Level	Grades nine through twelve
Time	Three weeks

Overview

This project is an authentic experience that helps students apply concepts from science, economics, geography, psychology, government, and computer applications. It also reinforces reading, writing, mathematics, and problem solving skills. Students are presented with the opportunity to revitalize a deteriorating neighborhood around a local resource, the Towpath Trail. Over a three-week period, students research the history of the Ohio Canal, aspects of city planning, and economic development. Working in groups of six, they create a brochure, a PowerPoint presentation, and a three-dimensional model of their design for the neighborhood.

Major Objectives

Ohio Competency-Based Standards

SOCIAL STUDIES

Geography:
- Read maps, charts, or graphs to draw conclusions regarding natural resources and topography of the US and the world

Government:
- Identify the legal responsibilities of citizenship
- Use appropriate resources to research antecedent developments to current issues
- Demonstrate the ability to use information that enables citizens to make informed choices
- Consider democratic principles when designing solutions to current issues
- Evaluate the reliability of information
- Justify proposed solutions to current issues from the perspectives of various cultural groups
- Work as an individual or as part of a group to plan a strategy and possibly develop alternative strategies for addressing the issue and determine which strategy will be utilized

Economics:
- Create alternative scenarios pertaining to current issues to determine the impact of personal and social economic decisions on the allocation of resources
- Identify factors that have contributed to America's cultural pluralism, including historical, racial, ethnic, religious, and linguistic backgrounds of this nation's people

LANGUAGE ARTS AND WRITING

- Chooses words appropriate to the audience, the purpose, and the subject
- Follows a logical order
- Uses sentences of varied length and pattern
- Uses correct spelling and punctuation
- Conveys a sense of completeness
- Includes relevant and clearly developed supporting ideas or examples

Reading:
- Given everyday/functional reading materials: identify, locate, and use information in items regarding the selection and use of appropriate reference sources and illustrative materials

SCIENCE

- Determine how a given environmental change affects an ecosystem
- Formulate models and hypotheses that can be used to explain the interactions of components within technological and ecological systems

SCIENCE (continued)

- Develop and write environmental impact, safety, and hygiene management plans
- Use appropriate technologies to prepare and present the findings of investigations incorporating tables, graphs, diagrams, and text

ITAC Core Competencies

1.1 Solve problems and make decisions in work-related situations
1.2 Read for information and understanding
1.3 Use observation skills to analyze work-related situations
1.4 Apply mathematical processes
1.5 Apply measurement and spatial skills
1.6 Apply statistical analysis skills
1.7 Analyze critical data to guide work activities
1.8 Utilize scheduling and cooperating learning techniques to ensure that jobs are completed by stated due date
1.9 Demonstrate knowledge of the economy and how it functions as a whole
1.10 Demonstrate knowledge of the economy as a framework within which decisions are made by individuals and groups

Performance Objective

Demonstrate the ability to apply concepts from science, economics, geography, psychology, government, and computer applications as developed in proficiency standards.

Preparatory Information for Teachers/ Materials Needed

1. Students will need access to computers and PowerPoint or similar presentation software.
2. Area maps and materials for making three-dimensional models of their designs will be needed.
3. Two field trips are recommended: one to the Towpath Trail site and another to the area career center for those students creating the three-dimensional model. The field trip to the career center is to train those students in basic computer-assisted design. Field trip permission forms will need to be completed and turned in at the beginning of the project.

Career Task Scenario

You are among a team of architects hired to plan the revitalization of a deteriorating area near the proposed Phase II extension of the Towpath Trail. In spite of a rich ethnic history and residents/businesses who are committed to seeing the area thrive, the neighborhood is plagued by little or inadequate housing, abandoned buildings, crime, and declining businesses. The City Planning Commission is prepared to provide resources to encourage economic development, recreation areas, and better housing. Create a design for the neighborhood with the Towpath Trail as the centerpiece, and present your plans to the Commission for their approval.

Guiding Questions

1. **What alternative uses should be considered for the adjoining land to best meet the needs of the community and its citizens?**
2. **What historic and current economic, social, and environmental factors should be considered in the creation of the plan? Where do we locate information?**
3. **How can algebraic and geometric skills be applied to determine available land?**
4. **What data regarding the needs and concerns of businesses/citizens would inform the design of the neighborhood?**
5. **How can we synthesize data to create charts, proposals, and explanations in brochures?**
6. **What are the economic benefits of the Towpath Trail? What are the social benefits?**

Instructional Activities Include

- Research history of Towpath Trail area and Ohio Canal
- Speaker from County Planning Commission on economic development and its impact on residents, obstacles and benefits, and community involvement
- Classroom research on zoning and tax base
- Research information on economy of the area, housing values, business interests
- Speaker from Area Economic Development office
- Demonstration of map reading
- Train students to use software needed to complete final products – Microsoft Word, PowerPoint, or computer-assisted design
- Field trip to Towpath Trail

Cooperative Group Information

Assign six students per group, selected from different classes. If poor attendance is a problem, assign students to groups with like attendance. Assignment may change to individual research (fifteen-page) paper pertaining to project, if attendance prevents active participation.

Project includes three activities per group: one brochure, one presentation in PowerPoint, and one three-dimensional model. For activities: two students will create the brochure, two students will design the presentation, and two students will create the three-dimensional model of the revitalization design.

Each student has three grades: individual journal, small-group activity, and participation. In-process grades will be given during the three-week run of the project.

Project Structure

Students will use information from class to create a vision for the property located near the trail and will summarize that vision through one of three mediums: a brochure, a PowerPoint presentation, or a three-dimensional model of the plan.

In order to help students establish short-term, self-referenced goals, the teacher will provide criteria sheets for final products and facilitate and monitor activities. A participation grade will be worth 100 points.

Support development and use of effective learning strategies by use of think-alouds to connect new knowledge, tips on time management, and tips on problem-solving.

Focus on helping students make their own decisions. Give them opportunities to develop responsibility and independence by providing clear timelines for due dates.

Use peer assessment to check student progress. This will help students develop their ability to assess their own and others' work using the criteria sheets.

Assessment

Formative Grade: (Maximum 150 points)

- In-process journal
- Rough drafts of final products
- Participation to date

Summative Grade: Three Parts (300 points maximum)

1. Individual Journal (100 points or 33% of final grade)

- What you did today
- What you learned
- What you liked and disliked
- Notes from lecture presentation

2. Participation-Individual Grade (100 points or 33% of final grade)

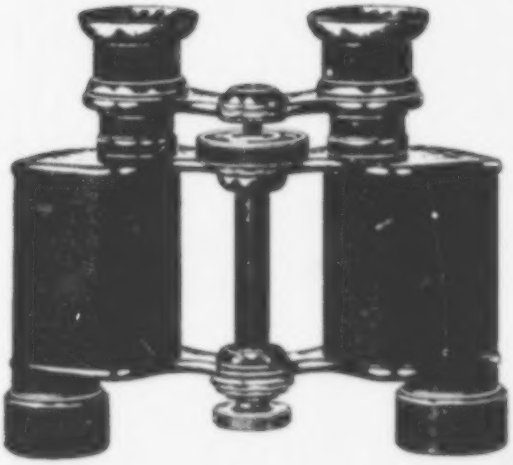
- Daily grade
- Involvement in group and activity

3. Activity-Small Group (33% of final grade)

- Responsible for one final product with another person (brochure for a County Planning Commission audience, PowerPoint presentation for a community audience, or three-dimensional model)
- Rough-draft grades will be taken of each product (50 points)

Procedures and Timeline

Day	Week 1	Week 2	Week 3
Monday	Introduce project in respective classes; assignment to team, discuss assessment, journal, cooperative group tips, alternative assignment (fifteen-page paper), team role, distribute field trip permission slips, etc.	Generate questions for speaker on economic development in the area, application of map reading, submit rough draft of ideas, three-dimensional model, students sketch on graph paper. Raffle one t-shirt per period. Locate 15 cameras and photocopy pertinent information on Towpath history.	Review final product criteria in respective labs. • Peer assess rough draft, return, then submit to teacher in room. Work in pairs on final product.
Tuesday	Meet with all classes together, review yesterday's criteria, assign final products within groups. Lecture on history of the Towpath Trail area.	Speaker: local Director of Economic Development	Review information on economy of area, housing values, business interests, etc. Work in pairs on final product.
Wednesday	Speaker from County Planning Commission discusses business development and community involvement. Set up peer tutoring by computer-assisted design students for those working on three-dimensional model. Design elements for those working on brochure.	Speaker on digital design and software training for those students working on brochures. • PowerPoint training for those students working on presentations • Career center training for those students working on three-dimensional model	In small groups, finalize slide show, three-dimensional model, brochure, and journals.
Thursday	Lecture on zoning, tax bases, etc. Assemble groups and discuss keeping businesses, ideas for new businesses.	Field trip to site.	Presentation of groups, three-dimensional model, slideshow, collection of brochure and journals.
Friday	Map reading, begin layout of revitalization	Work in pairs in respective labs on final product. Raffle t-shirts and game.	Same as previous day.
Saturday		Extra Credit: Clean up banks of river.	



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Project Highlights

Instructional Topic	Incentives in the Workplace
Grade Level	Grade nine
Time	Three to four weeks

Overview

This unit is reality-based and includes a situation which your students may find familiar: workers in a fast food restaurant showing a lack of motivation on the job. The opening scenario sets the stage for a multilevel research project requiring the student to use various skills relative to a language arts class, but also applicable to an interdisciplinary approach.

This unit provides enough material for a three to four week project, although the timeline could be adjusted depending on your criteria. The end product includes a written report that finalizes all information learned and an oral presentation to the class which meets additional competencies.

Major Objectives:

Ohio Competency-Based Standards

ENGLISH

Reading
- Read to clarify personal thinking and understanding
- Recognize the interaction between literature and various cultural domains
- Value the thinking and language of others

Writing
- Use word processing, graphics, and publishing as aids for constructing meaning in writing
- Use multidisciplinary resources in writing projects

Speaking
- Organize notes and ideas for speaking.

ITAC Core Competencies

1.1 Solve problems and make decisions in work-related situations
1.3 Use observation skills to analyze work-related situations
2.1 Apply basic communication skills
2.2 Apply oral communication skills
2.3 Apply written communication skills
2.5 Apply listening skills to enhance communication
2.6 Apply demonstration/presentation skills

Performance Objective

Research, create, and present a publicity campaign to promote work incentives for employees.

Preparatory Information for Teachers/Materials Needed

Read this entire lesson before attempting it with your students, so that you can make the necessary decisions and preparations needed.

Career Task Scenario

You are the assistant manager of a fast food franchise situated in a mall near your home. Your manager is concerned about her employees' lack of motivation on the job. Employees are late to work and don't seem to care about their jobs. Some of them ignore instructions on how customers should be served. She wants you to create an incentive program that provides rewards and recognition for a job well done. There are thirty employees; most are teenagers and middle-aged women. There are equal numbers of males and females among the teenagers.

Guiding Questions

- **What specific problems concern the supervisor?**
- **What concerns might the employees have that interfere with quality performance?**
- **Do all of the employees share those concerns?**
- **What kinds of rewards might be meaningful to the employees?**

Procedures

Start the unit by reading the scenario to the students, then use the guiding questions to help focus on concerns of either the employees or the manager. You may want to work with the class as a whole or divide the class into groups. In either case, use the guiding questions to focus the discussion, and record student responses in a visible area of the room.

Mark off a clean chalkboard into sections. Label each section with the number of one of the guiding questions. (An alternative would be to use a large sheet of paper for each question.)

If you wish to work in groups, one alternative is to give each group a set of blank sticky notes and tell each member of the group to think of as many responses to the guiding questions as possible.

Tell the students to:

- work alone in silence
- write the number of a question and one short response to that question per sticky note
- write as many phrases as they can think of in two minutes to each of the guiding questions (one idea per sticky note)

Let each student share the notes with the entire class by sticking them on a clean chalkboard or on large sheets of paper in view of the class. The chalkboard (or sheets of paper) should have spaces numbered to correspond to each of the guiding questions.

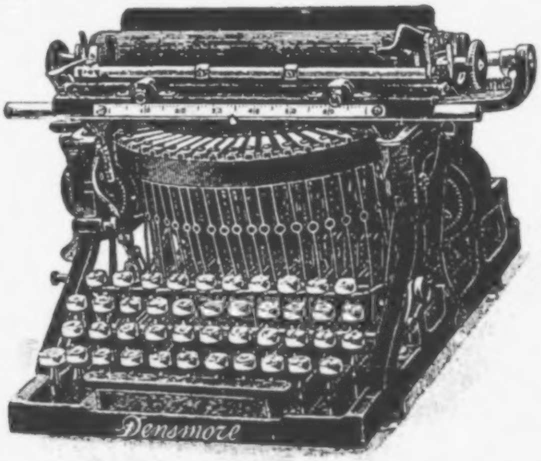
When all responses are posted, ask a student from each group to move the sticky notes around on the board so that similar responses are together. Then discuss the ideas that emerge. There will be some ideas common to many, and others that are unique to one person. This activity, which is often used by organizations in their quality improvement sessions, gives everyone a chance to have input and provides a focus for a "group think" (discussion) which may be led either by students or the teacher. However, putting more responsibility on the students in such activities is a great preparation for life beyond school.

Tell students that they will have to do much of their research and projects outside class, but that they will have some time in class to work on them. They will also be spending class time with you on additional lessons to help them learn skills for their final projects.

Depending on the skills of your students, you may want to add lessons to those provided here; e.g., note-taking, making charts and graphs, separating fact from opinion, and others. In preparation for the final project, you should probably take one class period to let the class make a list of fast food establishments in your area. Bring phone books into class so students can check on locations and phone numbers. Have students sign up to contact different ones so that all don't flock to – and overwhelm – one or two establishments. Tell students to make their contacts at a time more convenient to those they will be interviewing. If students want to tape-record responses of the person they will be interviewing (and if the person agrees to be taped), you may want to give them some time to practice and share pointers in class beforehand. You may want to consider letting students work in pairs on this project, both for moral support and for the improved product that is likely to be the result of collaboration. Collaboration is an essential skill for any workplace.

Finally, the literature selections for the suggested literature-based lessons are found in *Literature and Language* (McDougal, Littel, 1994, Grade Nine). However, most of them can be found in a variety of other commonly used anthologies. You may wish to substitute other selections, such as the following stories from *Adventures in Reading* (Harcourt, Brace, Jovanovich):

The Most Dangerous Game by Richard Connell
The Secret Life of Walter Mitty by James Thurber
The Cask of Amontillado by Edgar Allen Poe
The Necklace by Guy de Maupassant
Dream Deferred by Langston Hughes



Instructional Activities Include

1. **Identify the problems resulting from non-motivated workers.**
2. **Identify areas of concern that workers feel interfere with work.**
3. **Establish the criteria on which recognition for employees would be established (i.e., how and why would the employees be recognized and/or rewarded).**
4. **Create a procedure for how you would make your ideas for an incentive program work.**
5. **Create a publicity campaign to promote this program with the employees.**

Completing these activities will take research. Research can include many different ways of searching for information. For example, you may find results of surveys in the library or on the Internet that will help to answer #1, but an interview with the manager of a fast food restaurant will give you first-hand information related to #1 and #3.

For #2, you will need to interview people other than managers who work in fast food restaurants.

For #4 and #5 you will need to use creativity, plus what you have learned from your interviews, to create an incentive program and publicize it to employees.

As you conduct your research, keep a journal showing the amount of time that you have spent and what you have accomplished. When your incentive program is completed, you will submit your plan to your supervisor (teacher), and present your findings orally to your fellow employees (class). The presentation should include a visual representation of the incentive program, which might be a sample brochure you have designed to explain the program to the employees or a PowerPoint demonstration which explains the program to the employees. Be as creative as you can.

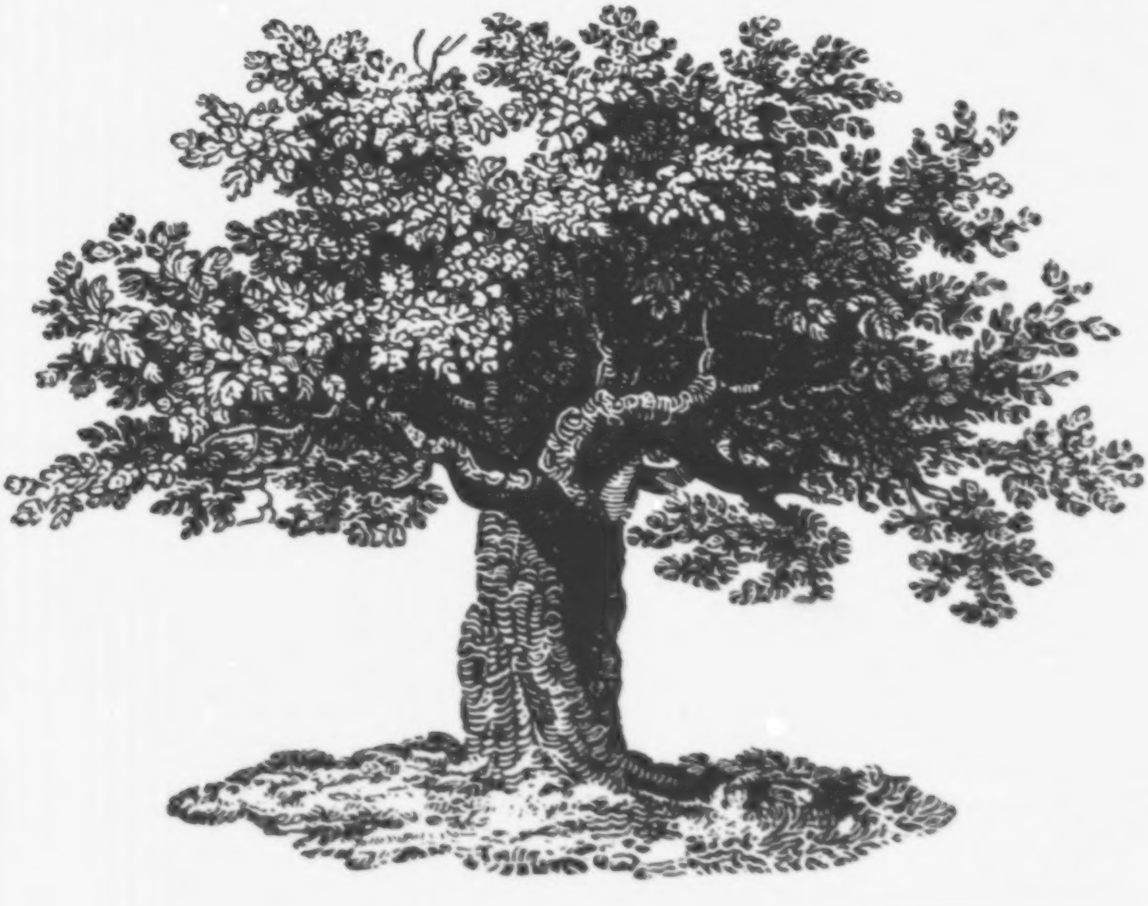
Assessment

Students' assessments from each lesson and from the final project can be averaged as part of the final grade. Heavier weight should be given to the final project, since it is the ultimate goal of the entire unit; i.e., the incentive plan for poorly motivated workers with its accompanying products.
(brochure, PowerPoint presentation, et al.)

The oral report should explain:

- An incentive program designed for an existing or imaginary company, or;
- How to create a publicity campaign "kicking off" an incentive program that someone else has designed.

This oral report could be a simple speech of four or five minutes, or a more technology-based method such as a PowerPoint presentation. The student will benefit in two ways: developing skills in oral presentation and dispensing information to other students.



LANGUAGE ARTS: INCENTIVES IN THE WORKPLACE

Lesson One

Objective

- Define and understand incentive as "a motivational tool"
- Read a fictional story and apply the idea of incentive to the characters

Materials

Giving Blood by Roberta Silman

Activities

1. Read the story as a class assignment, perhaps starting the story in class and having students finish it before tomorrow's class.
2. Discuss the procedure of giving blood.
3. Discuss characters' reasons for not wanting to donate blood.

Assessment

Choose one:

1. Write three slogans that might give people an incentive to donate blood.
2. Write a letter to a friend that would encourage him/her to give blood.
3. Skim the story and list new facts you have learned about giving blood.

Lesson Two

Objective

- Define peer pressure as an incentive tool
- Read a fictional story and apply the idea of peer pressure to the characters

Materials

Initiation by Sylvia Plath

Activities

1. Read the story as a class assignment.
2. Discuss students' personal experiences with peer pressure.

Assessment

Choose one:

1. Conduct a survey of at least ten students. Ask them to rate their experiences with peer pressure on a scale of one to five. Write a summary of your results.
2. Your school proposes to ban a student club because of its initiation practices. Write a letter to your principal stating your opinion.

Lesson Three

Objective

- Read a nonfiction selection
- Identify the incentives that the characters experience

Materials

A Trip to the Edge of Survival by Ron Arias.

Activities

1. Read the selection as a class assignment.
2. Explain the possible purposes of nonfiction (entertain, persuade, inform, share an opinion).
3. Identify the purpose of this selection.
4. Discuss the examples of incentives for each of the survivors.

Assessment

Choose one:

1. As captain of this trip, you must keep a log. Using the facts from the story and the map, write entries (speed, location, and important events) in your log for three days at sea.
2. Write an article for your local newspaper summarizing the rescue of the crew members.

Lesson Four

Objective Learn effective techniques of interviewing for information. Practice those techniques

Interview Tips Main steps in the interview process

Before the Interview

1. Define your purpose. What do you hope to find out in this interview?
2. Prepare the questions you will ask the person being interviewed.

- Make the questions clear and direct
- Write them down
- Avoid questions you can already answer
- Avoid vague questions
- Avoid leading questions

Consider using a tape recorder. If you plan to use one, get permission from the person you plan to interview, and then:

- Test the tape recorder before taking it to the interview
- Be sure you have more than one tape
- Take fresh batteries and an electric cord w/plug

Advantages of using a tape recorder: You can concentrate on the interview without taking notes. Your record of the interview will be accurate, with no missing details.

Disadvantages of using a tape recorder: Many people are uncomfortable talking into a tape recorder. It takes a lot of time to review the entire tape afterward.

During the Interview

- Be prepared and on time
- Ask your questions, but be prepared to take your cue from the person being interviewed
- Save tough questions until later in the interview

After the Interview

1. Review your notes as soon as you complete the interview.
2. Make necessary changes and additions to your notes.
3. Identify the main ideas and details for a one-page summary of the interview.

Activities

1. Read the interview tips in class
2. Define the purpose of the interview.
   (This could be related to the scenario project or to the selections read from the text.)
3. Create a list of questions to be used in the interview.

Assessment

In preparation for your interview at a fast food restaurant, interview a friend, teacher, or relative, perhaps about their experiences with [obviously] unmotivated workers in fast food restaurants. Write a one-page summary of the interview.

Lesson Five

Objective

- Practice note-taking skills
- Gain information about an incentive program from a knowledgeable person in the workplace

Materials

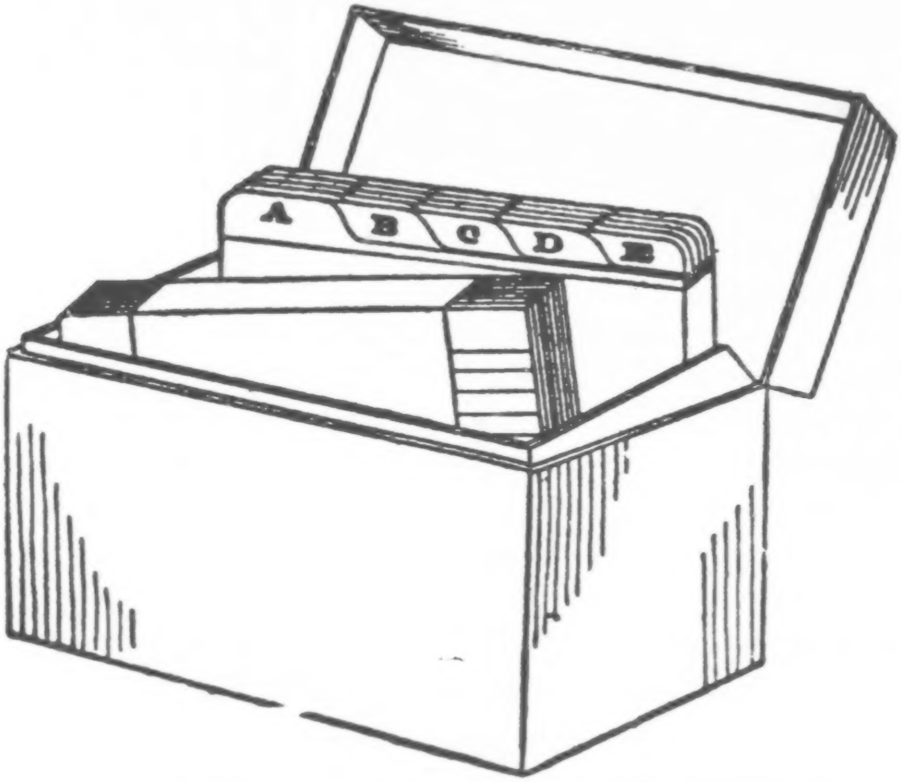
Invite a speaker from a local business, perhaps from a human resources department.
This could be an appropriate representative from any local business or a business partner who works with the school or district.

Activities

Ask the speaker to explain typical problems resulting from non-motivated workers and to explain how his/her company's incentive program has affected the workers' productivity.
Students will take notes and ask questions.

Assessment

- Rewrite and revise the notes taken during the interview so that they are legible and complete.
- Write a summary of the interview, including all main points.



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WHISK
MADE IN NEWARK U.S.A.

FABER TWIST

Project Highlights

Instructional Topic	Minimization and Maximization Problems in a Manufacturing Setting
Grade Level	Grades nine and ten (adaptable)
Time	Seven to ten days

Overview

A new juice producing company, Miracle Man Juice, is in the process of designing the container for its new juice product. The decision has been made that the single serving can hold 300 milliliters. The container should be cylindrical in shape. Given the high cost of metal, the manufacturer wishes to use the minimum amount of metal to make the can. ACM has been hired to provide the dimensions and manufacture the can. The student's answer must be to the nearest hundredth of a centimeter.

Major Objectives

Ohio Competency-Based Mathematics Model

- Create and interpret drawings of 3-D objects
- Represent problem situations with geometric models and apply properties of figures
- Organize data into charts
- Read and interpret data to identify patterns, note trends, draw conclusions, and make predictions
- Describe geometric situations and phenomena using variables, equations, and functions

ITAC Core Competencies

1.1 Solve problems and make decisions in work-related situations
1.7 Analyze critical data to guide work activities
2.2 Apply oral communication skills
2.3 Apply written communication skills
3.1 Demonstrate technological literacy
3.5 Use a spreadsheet

Performance Objective

Demonstrate the ability to apply concepts from geometry, data analysis and probability, and algebra to:

1) Construct a three dimensional model of a cylindrical can.
2) Use a spreadsheet to determine which can meets the volume requirement and will be the least expensive to produce.
3) Communicate to the customer in writing the recommendation for the "best" can size.

Preparatory Information for Teachers/Materials Needed

Pre-requisite Skill and Concept Questions Handout (see Resources section)
Metric Rulers and Compasses
Scissors and Clear Tape
Construction Paper
Programmable Calculators
Computers with a spreadsheet program

Career Task Scenario

ACM (All Container Manufacturing) is a company that makes containers of all shapes and sizes. You are in charge of setting up orders to meet customer specifications. All orders must meet a tolerance; the container can be no more than .1 centimeters above or below the customer's specified linear measurements. With volume specifications, the tolerance is .001 cc below but not exceeding customer specs. The following order has just been sent to your desk:

Order #0001

Dear ACM,

We need a can that holds 300 ml. Our company has determined that the top and bottom of the can should be made of metal. The metal cost is $20/square meter. The material for the rest of the can is to be treated paper; it costs $3.75/square meter. We want you to consider cost effectiveness with these materials in mind. Please let us know the dimensions of the can before production. We will be contracting label production for the can and need these dimensions ASAP.

Sincerely,

J. T. Miracle

Miracle Man Juice Inc.

Guiding Questions

You must ask yourself these questions …and answer them. The ACM supervisor for your section requires a clear complete sentence answer for each question regarding container projects. Use the Handout for Discussion of ACM Project (see Resources section).

1. **What are the important facts we need to solve this problem?**
2. **What are the relevant formulas?**
3. **What is the shape of the container? Can you draw this container?**
4. **What would a cutting layout look like?**
5. **How many pieces does the layout for the container require?**
6. **How can you determine the size of the pieces required and how you make them fit together?**
7. **A model container is required. What are the parts of the container, described in simple geometric shapes?**

(Note: Have students make the model now. The teacher, as the section supervisor, will check the model.)

Lesson One

Activities (Use only if students are struggling.)

1. Make a model. Your supervisor (teacher) must approve the model.
Write an equation for the area of each geometric shape required for the container. (Top/Bottom and "Sides")

Top: ______________________________

Bottom: ______________________________

Sides (Lateral Surface): ______________________________

2. Write a description and an equation that will give you the length of the lateral surtace so that it will fit the top and bottom.

Description: ______________________________

Equation: ______________________________

3. Write a description and an equation that you will use to determine the height of the container. Check to see if you have a required amount of material to use.

Description: ______________________________

Equation: ______________________________

4. Write a description and an equation that you will use to determine the area of the lateral surface.

Description: ______________________________

Equation: ______________________________

5. Write a description and an equation that you will use to determine the total area of the container. Check to see if there is a limit set by the customer.

Description: ______________________________

Equation: ______________________________

Lesson Two

Using the Spreadsheet as a Tool: Teacher's Guide

Class Discussion Questions/Activities:

What can you do to choose four different radii for the cylinder that will allow the volume to be the required 300 ml?

1. Show an example spreadsheet and show how changes to dimensions affect the volume.

Have students choose the formulas that they have listed in the Lesson One activities that will be needed to calculate volume. Show students how to enter these formulas into a spreadsheet. (This may not be needed if students have used spreadsheets before.)

Show how changing the radius in the formula for the cylinder changes the volume. Ask the students to decide how the formulas should be entered to keep the volume at 300 ml. Then have students enter the formulas into a spreadsheet (or calculator).

Discuss lateral surface area and total surface area. Have the students determine what the formulas are for these areas and enter them into their spreadsheets.

2. Write a program for the calculator or use a spreadsheet to examine different dimensions in searching for the ideal can size.

Using a spreadsheet and/or calculator allow students to use algebraic formulas to determine and investigate different possibilities.

Students may require a demonstration for entering formulas and/or writing a program to pursue this investigation.

3. Fill in the following table or print the spreadsheet showing your results for five containers that will meet the customer's container specifications.

Radius	Diameter	Height	Area Top/Bottom	Lateral Area	Volume

4. What could you do to decrease the surface area as you choose other numbers for the radius?

Lesson Two

Using the Spreadsheet as a Tool: Student Page

Class Discussion Questions/Activities:

1. What can you do to choose four different radii for the cylinder that will allow the volume to be the required 300 ml?

2. Write a program for the calculator or use a spreadsheet to examine different dimensions in searching for the ideal can size. How would you do this?

3. Fill in the following table or print the spreadsheet showing your results for five containers that will meet the customer's container specifications.

Radius	Diameter	Height	Area Top/Bottom	Lateral Area	Volume

4. What could you do to decrease the surface area as you choose other numbers for the radius?

5. How can a spreadsheet help you determine the can that uses the least material?

6. Use the spreadsheet and/or programmable calculator for the following:

- Allow an input of the radius
- Set the volume of the cylinder at 300
- Use a formula to calculate the height
- Use a formula to calculate the surface area

Lesson Three

Analyze the Data, Make Predictions, and Draw Conclusions

Activities:

1. Use the calculator program or spreadsheet to find the container that requires the least amount of material.

2. Continue this process until you acquire the "best" solution to the nearest hundredth of a centimeter.

3. Consider the requirements from the customer. Have you met the criteria set?

4. Is the container with the smallest surface area the most cost effective?

5. Fill in the table below or complete a spreadsheet with these details and attach a printout to this report. Show at least five cans on this sheet.

Radius	Diameter	Height	Circumference	Volume	Area Top/Bottom	Lateral Area	Cost Top/Bot	Cost Lateral	TotalCost

6. Which can is most cost-effective? Highlight or circle it.

Lesson Four

Summary

Activity:

Write a report to Mr. Miracle at Miracle Man Juice Co.

Explain the dimensions of the can that you recommend. Relate your recommendation to the company's original specifications of volume and cost.

Attach the following to your report summary:

- A drawing of the can in 3-D and in layout form with dimensions
- A hard copy of a spreadsheet showing at least five cans that meet the criteria given by the Juice Co. Highlight or circle the one you recommend.

The above summary will be graded in the following manner:

The written report must include:	**Your Points**
1. Explanation of dimension in the recommendation	
Clear recommendation and complete explanation-------10 points	
Not complete and/or not clear but explained--------- 7 points	
Not complete or clear and not explained--------- 4 points	
No recommendation or explanation--------- 0 points	
2. Relate your recommendation to the company's specs for volume and cost.	
Recommendation referred to volume and cost of specs------10 points	
Recommendation referred to volume but not cost--------- 5 points	
Recommendation referred to cost but not volume--------- 5 points	
Recommendation did not refer to specs given--------- 0 points	
3. Layout view of cylindrical can showing the dimensions	
Layout view included with all dimensions---------10 points	
Layout view included no dimensions--------- 5 points	
Layout view not included--------- 0 points	

The written report must include: (continued) **Your Points**

4. 3-D Sketch with dimensions

3-D Sketch included with dimensions ------- 10 points ________

3-D Sketch without dimensions -------- 5 points ________

No 3-D sketch --------- 0 points ________

5. A spreadsheet showing five cans that meet the criteria given
with recommendation marked.

SS/table- inc. five cans meeting the criteria and recommendation --- 10 points ________

SS with less than five cans that meet criteria - recommendation --- 7 points ________

SS with five cans meeting criteria and no recommendation ---- 7 points ________

SS with one to four cans that meet criteria
and no recommendation ----- 5 points ________

SS with two (or more) cans included that
do not meet criteria given ---- 2 points ________

SS not included ----- 0 points ________

Summary -TOTAL points possible: 50 points

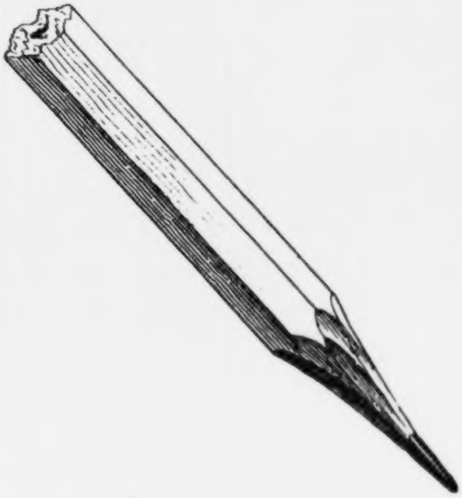
Other Assessment:

Assessment will be ongoing throughout the project.

The following would also be used in assessment.

Completion of the model	----- 5 points
Participation in discussions	----- 5 points/day
Participation in daily activities	----- 5 points/day
Clear descriptions/equations (part 1)	----- 11 points (1 point each)
Lesson II Activities (Volume Chart)	----- 5 points
Lesson III Activities (Cost Chart)	----- 5 points

RESOURCES



Pre-requisite Skill and Concept Questions

1. What is the radius of a circle?

2. What is the diameter of a circle?

3. What is the formula for the area of a circle?

4. What is the formula for the circumference of a circle? Explain what the circumference of a circle is.

5. What is the formula for the volume of a cylinder?

6. How can you find the height of a cylinder when you are given the volume and the radius? Find the height of a cylinder with a radius of 5 cm and a volume of 600 ml.

7. Find the volume of a cylinder given the ht. = 8 and the radius = 3.75.

8. If you cut a cylinder apart so that the top and bottom are removed and then cut down the side and unroll it, what shapes will you have? Draw the parts and show how the total surface area is derived.

9. Explain what the lateral surface area and total surface area of a cylinder are.

10. Find the volume of a cylinder: given the height = 4 cm and the radius = 4 cm.

11. How are cubic centimeters (cc) and milliliters (ml) related?

12. How could you find the dimensions for a cylinder that will hold 350 ml and require the least material to make? (to the nearest thousandth of a centimeter)

13. Would every cylinder with a volume of 500 ml have the same dimensions? Explain your reasoning.

Note: The above set of questions may be used all or in part as a discussion starter, pre-test, quiz, or review. Students should at least have experience with these skills and formulas before beginning the ACM unit.

Handout for Discussion of ACM Project

(Use in Lesson One if students are struggling)

Restate the problem.

List important information and relevant formulas.

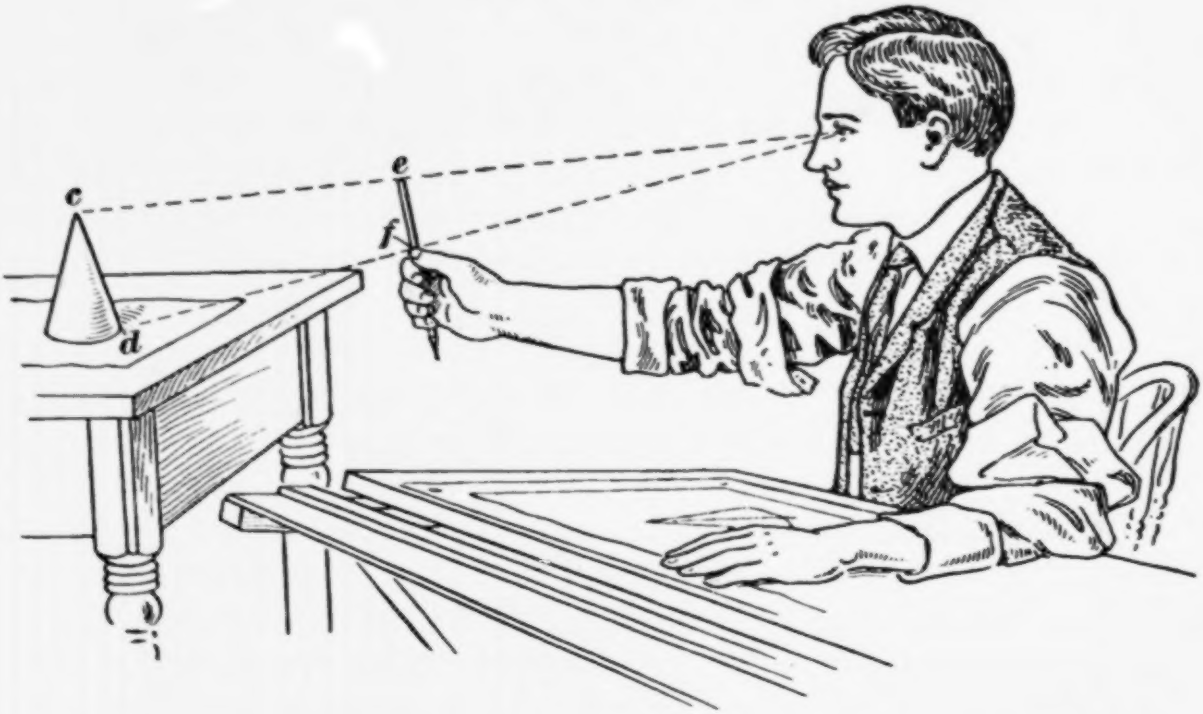
Sketch some pictures.

What would a 3-D picture look like?
Sketch it. What would a layout look like?
Sketch it. How can we label the pictures and show dimensions?

Put dimensions on your sketches.

Make model containers.

(This must be checked by your supervisor.)
How do we make the shapes that will be used to make the can so that they will fit together?



BEST
TOMATOES
LEXINGTON
LOOSE LEAF FILLER
DOVE
BAILEY'S INK & PENCIL ERASER
PAT. APPLIED FOR
COLMAN'S
MUSTARD

Project Highlights

Instructional Topic	The Science of Safe Drinking Water
Grade Level	Grades nine and ten
Time	Two to three weeks

Overview

This instructional unit immerses the student in a real world problem of how to dispose of toxic wastes created by the production of electronic items, such as computers, TV's, etc., which require circuit boards. The societal, issue-oriented activities of this module teach chemistry-oriented concepts by utilizing process-oriented skills. It is based upon the SEPUP module called *Toxic Waste: A Teaching Simulation* developed by the Lawrence Hall of Science, University of California at Berkeley and funded by the National Science Foundation. The module includes background information, student activity sheets, and assessment items. It can be purchased from Sargent Welch. More information can be obtained by calling 1-800-727-4368.

Permission granted for adapting this module by Barbara Nagle, SEPUP staff at the Lawrence Hall of Science.

Major Objectives

Ohio Competency-Based Science Model

SCIENCE

Inquiry
- Check the appropriateness and accuracy of measures and computations using various strategies
- Use ratios, proportions, and probabilities in appropriate problem situations
- Translate information from and represent information in various forms with equal ease
- Seek elaboration and justification of data and ideas and reflect on alternative interpretations of the information
- Utilize appropriate units for counts and measures
- Create and use databases (electronic and other) to collect, organize, and verify data and observations
- Communicate the results of investigations clearly in a variety of situations

Knowledge
- Investigate various types of dynamic equilibrium
- Investigate the relationship between the rates of energy exchange and the relative energy level of components within systems
- Investigate physical and chemical changes in living and non-living systems
- Formulate interpretations of the structure, function, and diversity in a variety of organisms and physical systems
- Formulate explanations and representations of the production, transmission, and conservation on energy in biological and physical systems

Conditions of Learning
- Participating actively in dialogue about and resolution of community issues
- Performing and repeating investigations to verify data, determine regularity, and reduce the impact of experimental error
- Presenting the results of investigations in a variety of forums
- Contributing to the decisions regarding topics for investigation.
- Individually and collaboratively producing clearly written representations of investigative results
- Fulfilling responsibilities as part of a research group
- Selecting and utilizing resources by various criteria (e.g. , efficiency, effectiveness, health, safety) that are appropriate to the investigations being conducted by groups
- Investigating social issues with a scientific perspective (e.g., human rights, wellness, economics, futurism, environmental ethics)
- Creating presentations of scientific understanding using diverse modes of expression
- Listening attentively and critically to presentations of scientific information made by others

Major Objectives

Application
- Making personal behavior decisions by interpreting information that has a scientific basis
- Proposing courses of action that will validate and demonstrate personal understanding of scientific principles
- Guiding other learners in their understanding of the interactions of technologies and society at various periods in time
- Promoting and carrying out practices that contribute to a sustainable environment
- Making inferences, and drawing conclusions using databases, spreadsheets, and other technologies
- Evaluating the social and ecological risks and benefits resulting from the use of various consumer products
- Identifying and reducing risks and threats to a sustainable environment

ITAC Core Competencies

1.1 Solve problems and make decisions in work-related situations
1.2 Read for information and understanding
1.3 Use observation skills to analyze work-related situations
1.4 Apply mathematical processes
1.5 Apply measurement and spatial skills
1.6 Apply statistical analysis skills
1.7 Analyze critical data to guide work activities
1.8 Utilize scheduling and cooperating learning techniques to ensure that jobs are completed by stated due date
1.9 Demonstrate knowledge of the economy and how it functions as a whole
2.1 Apply basic communication skills
2.2 Apply oral communication skills
2.3 Apply written communication skills
2.5 Apply listening skills to enhance communications(s)
2.6 Apply demonstration/presentation skills
2.9 Convey information through multimedia presentation
2.10 Create graphs and charts
2.11 Build interpersonal relationships
4.1 Demonstrate leadership
4.3 Choose ethical courses of action in all work assignments and personal interactions
6.5 Implement safety procedures and programs
6.7 Manage work and family responsibilities for the well-being of self and others
6.8 Determine resources needed to produce a given product or provide a service
6.11 Make informed financial decisions

Performance Objective

Please see Instructional Concepts and Activities section under "Processes" for multiple performance objectives.

Preparatory Information for Teachers/Materials Needed

This career-focused learning experience employs the learning cycle, proposed by Trowbridge and Bybee (1990), as the instructional model. The model has five phases, which are: **engagement, exploration, explanation, elaboration, and evaluation**. A description of the instructional model can be found in the Resources section.

The Teacher's manual for *Toxic Waste: A Teaching Simulation* must be ordered from Sargent Welch. (Tel: 800/727-4368)

Career Task Scenario

You have just been hired as the environmental health and safety engineer for Nicholas Enterprises, a large computer chip manufacturer. Even though you are new to the company, you are expected to correct a problem that has been plaguing the company since it was founded. That problem is how to safely dispose of toxic copper waste created during the manufacture of copper circuit boards. Your company has been ordered to pay heavy fines in each of the last five years because it has not been able to control the copper waste. If you don't find a solution to the problem, your company (and your new job) will be eliminated. You are not even sure how the copper waste is made.

Guiding Questions

The question that encompasses all the activities is:
How can we make our waste water safe at a reasonable cost?

ACTIVITY ONE

Activity One, Part One

1. How do solutions conduct electricity?

Activity One, Part Two

2. How does the knowledge of how solutions conduct electricity contribute to the understanding of how copper waste is produced?

ACTIVITY TWO

3. How much water must be added to the used copper solution (50,000 ppm) to change it to the concentration allowed by the metropolitan sewer district where Nicholas Enterprises is located? How can you tell if copper is present at levels so low that you cannot see the blue color?

4. How sensitive is the ammonia test for copper?

ACTIVITY THREE

5. Can aluminum be used to chemically remove the copper from the toxic wastewater and how will you know?

ACTIVITY FOUR

6. Can metals other than aluminum remove copper from a solution? Which of the metals is the best to use in terms of safety, efficiency (in terms of how much copper can be removed), and cost?

ACTIVITY FIVE

7. Is there another way to remove copper from a solution that is safe (in terms of meeting regulations), efficient (in terms of how much copper can be removed), and cost effective?

ACTIVITY SIX

8. Is there a process that will convert the liquid toxic copper waste to a solid that has the ability to resist leaching by acidic water and is safe and cost effective?

ACTIVITY SEVEN

9. Which method of copper sulfate disposal is the safest, most efficient, and cost effective?

Instructional Concepts and Activities

Chemistry Concepts	Processes	Societal Issues
Toxic waste, ions, electrolytes and nonelectrolytes, conductivity, electron flow, and electroplating heavy metals	Observe evidence of conductivity in solutions; investigate electroplating of copper.	Chemical reactions used in industry produce toxic waste that may pose disposal problems. What should be done?
Successive dilution and parts per million	Perform a successive dilution; calculate the amount of water needed for dilution; explore use of ammonia as a test for the presence of copper ions.	Water is used to dilute solutions containing toxic heavy metal waste to legal levels for disposal. Is dilution an answer to pollution?
Aluminum replacement reaction, waste treatment, waste reduction	Perform a metal replacement reaction; observe and interpret evidence of chemical reaction.	Toxic wastes often contain useful materials that can be reclaimed, reducing the amount of waste generated.
Other metal replacement reactions	Investigate the ability of various metals to replace copper ions in solution.	Different metals can be used to reclaim toxic substances from waste solutions.
Recommendations and decisions must consider effectiveness, cost, and regulations. What problems does reclaiming solve? What problems does it create?		
Precipitation reactions, filtrate, leachate, acid rain	Perform precipitation reactions and filter precipitates; determine the stability of the copper.	Preconcentration using precipitation is used in industry to treat toxic wastes. Consider environmental issues.

Assessment

Formative Evaluation

Process Skills evaluation

A component of the assessment should include how students are able to utilize science process skills. A description of two kinds of process skills and rubrics for assessing them are in the Resources section.

Evaluate data sheets from investigations.

Summative Evaluation

The teacher's manual for *Toxic Waste: A Teaching Simulation* includes a very good test item bank for authentic assessment.

Evaluate team presentations/recommendations.

Activity One

Copper Plating

Teacher *(ask the students)*:
In order to find and recommend a solution for controlling the toxic copper waste, what is the first thing that you must do?

Answer:
Understand how the copper waste is formed.

The teacher can employ the following activities in the learning cycle lessons in two different ways.
First, the exploration activity (part one) would be done followed by the explanation of the activity. Then the students would do exploration activity (part two) followed by the explanation of that activity.

The second alternative sequence would have the students do both exploration activities (parts one and two) before doing the explanation (combine the explanations). The sequence chosen would depend upon student ability and the amount of time available.

Part One

Concepts to be learned:

conductor
ions
electrode
electron
electrolyte
nonelectrolyte

Question to be answered for part one:
How do solutions conduct electricity?

EXPLORE

Teacher follows instructions found on page one of teacher's manual for *Toxic Waste: A Teaching Simulation*. Students work in cooperative groups.

Students are given sheet 1.1 from the teacher's manual.
The last two components of procedure #7 of part one (Does sugar form ions when it dissolves? and What is your evidence?) should not be discussed until after this investigation is finished (during the explanation) because students don't know what an ion is at this time.

EXPLAIN *(Be sure to let students explain to you what they learned!)*

Students will learn that salt carries electric current and sugar does not. They must tell you how they know that to be true -- what is the evidence?

Based upon the experience in part one of this investigation, introduce the terms conductor, ions and electrolyte and nonelectrolyte. The teacher determines the ability level of students, thereby determining the level of instruction.

Part Two

Concepts to be learned:

heavy metals
toxic waste and electroplating

Question to be answered for part two:
How does the knowledge of how solutions conduct electricity contribute to the understanding of how copper waste is produced?

EXPLORE

Follow instructions on page 6 of teacher's manual for *Toxic Waste: A Teaching Simulation.*

EXPLAIN

(Be sure to let students explain to you what they learned!)

After discussing question 1 on page 13, put a name to the process by introducing the term electroplating.

After discussing question 3, ask students if they know the meaning of toxic waste? Through questioning, have students tell you as much as they can about the meaning of toxic waste.

TOXIC -- poisonous, harmful to living things --- and WASTE -- a substance that has no further use or immediate value.

Ask students if the copper waste they just created is considered toxic waste. Use Internet research for this.

Narration

Now that you are finished with this investigation, you realize that the copper waste you just created is much like the waste produced by your company. This makes your task much clearer because you know how the copper waste is produced. To help you solve this problem, you decide to get your staff together to brainstorm some possible solutions for disposing of the copper waste.

After collecting and organizing all the information from the meeting, you decide to do your first investigation on the simplest method of disposal which is – dilution is the solution to pollution.

Ask the students to:

Make a list of ways you think Nicholas Enterprises could dispose of the copper waste.

It is unreasonable to expect students to identify too many specific solutions to the problem. However, the teacher can elicit several responses through questioning.
The responses might include ideas such as: pouring the copper waste down the drain, allowing the solution to dry and then throw it away (in the garbage), allowing the solution to dry and reusing the copper, or storing the waste somewhere. For this activity, focus on dilution as a solution.

After students have identified several methods of disposal, the teacher should inform the students that during the next activity they will investigate the advantages and disadvantages of diluting the solution and then pouring it down the drain.

Ask the students to research several things: the concentration of copper in a solution permitted in sewer water, the cost of water per gallon (convert to liters), and the effect of copper on living things.
Some information is provided in the teacher's manual but it is better to obtain local information.

Activity Two

Successive Dilution of Copper Chloride

Concepts to be learned

parts per million (ppm)
dilution

EXPLORE

QUESTION TO ANSWER

How much water must be added to the used copper solution (50,000 ppm) to change it to the concentration allowed by the metropolitan sewer district where Nicholas Enterprises is located? How can you tell if copper is present at levels so low that you cannot see the blue color?

Distribute student sheet 2.1 and follow the instructions in the teacher's manual and student sheet 2.1. Add an additional segment to question number 1: Now that you know how much water must be added to one liter of 50,000 ppm waste water and you also know the cost of water, how much would it cost to dispose of that one liter of 50,000 ppm copper waste water at a concentration acceptable to the metropolitan sewer district?

EXPLAIN (Be sure to let students explain to you what they learned!)

After the students have completed activity 2.1, help them construct a clear meaning for parts per million (ppm) and dilution, based upon the data they have collected in the data table and their answers to the problems and questions on the student sheet 2.1.

EXPLORE

Narration

Your research on copper waste and how to detect its presence told you that ammonia could be utilized to indicate the presence of copper at low levels. However, you still don't know just how sensitive the test is for the presence of copper. As you have learned, it is extremely important for you to know just how much copper is in a wastewater solution. Therefore you devise another investigation to answer the following question.

QUESTION TO ANSWER

How sensitive is the ammonia test for copper?

Distribute student sheet 2.2 and follow the directions in the teacher's manual and student sheet 2.2.

EXPLAIN (Be sure to let students explain to you what they learned!)

Question number 5 is the key question for students to understand after completing the investigation.

Narration

After completing your investigation concerning the feasibility of disposing of copper waste through the sewer system, it seems clear that dilution is more expensive than you first thought. Furthermore, dilution does not reduce the total amount of copper going down the drain, only the rate that it goes down the drain. Therefore, you decide to look for alternative disposal methods. Since your staff (your class) has already identified several possible alternative methods of disposal, you decide that you want to investigate a method that would reclaim the copper and allow you to either recycle it or sell it as a by-product. You recall from one of the workshops you attended during the past year that you may be able to chemically exchange the copper in the solution with another metal that is not hazardous. If this was possible, then you could recover the copper from the solution AND produce a new solution that would allow for easy disposal.

If this plan worked, you would have your problem solved and you would save Nicholas Enterprises a large sum of money. You decide to try an experiment involving aluminum as the metal you want to exchange for the copper.

End Activity Two

Activity Three

Copper Chloride - Aluminum Reaction

Concepts to be learned

single replacement reaction
observation
conclusion

QUESTION TO ANSWER

Can aluminum be used to chemically remove the copper from the toxic wastewater and how will you know?

EXPLORE

Distribute student sheet 3.1 and follow the directions found in the teacher's manual and student sheet 3.1 Students should answer the questions on student sheet 3.1.

EXPLAIN

(Be sure to let students explain to you what they learned!)

Question 7 on student sheet 3.1 will provide the answer to the exploratory question. Make sure students can justify their answer.

Question 10 asks the students what they think the reddish brown substance is and why they think that. They may, for example, think the copper metal found in the solution is rust. This will allow the instructor to introduce the word equation for the single replacement reaction that they, the students, just described and it will also allow the instructor to introduce and discuss the concepts of observation and conclusion.

The intellectual ability of the students in the class will determine how much chemistry can be taught. If, for instance, students describe the heat generated during the reaction, then exothermic reactions may be introduced to the class. The introduction of the exothermic reactions would occur only if students made the observation of heat being generated and if you thought students were able to understand the concept. It may also be possible to move beyond word equations for the simple replacement reaction they observed.

Narration

Now that you know that aluminum can be used to remove copper from a solution, you wonder if other metals can be used. You decide to test iron and zinc and compare those results with aluminum.

Activity Four

Metal Replacement

QUESTION TO ANSWER

Can metals other than aluminum remove copper from a solution? Which of the metals is the best to use in terms of safety, efficiency (in terms of how much copper can be removed), and cost?

EXPLORE

Distribute student sheet 4.1. Students should complete the data tables and justify the answers to their questions.

EXPLAIN

(Be sure to let students explain to you what they learned!)

Discuss the answers to the questions found on student sheet 4.1. Question number 6 is really the focus question for this activity. The teacher's manual offers a good guideline for this discussion, which is based upon the results of the investigation and the cost per pound of the metals being tested.

Narration

Your investigation has given you some good information concerning the cost of cleaning the toxic wastewater. You consider taking the information to your boss. However, you can't help wondering if there might not be other ways to clean the wastewater solution. Once again you refer to the notes from the workshop you attended last year and you recall a procedure that might work. Since your notes are somewhat incomplete, you decide to perform another investigation to test the safety, efficiency, and cost of this method.

Activity Five

Precipitation Reactions

Concepts to be learned

Precipitate
filter
filtrate
leaching
detoxified (optional)
preconcentration (optional)

QUESTION TO ANSWER

Is there another way to remove copper from a solution that is safe, efficient (in terms of how much copper can be removed), and cost effective?

EXPLORE

Distribute student sheet 5.1 and follow the instructions. Once again, make sure students provide evidence to support answers to the questions.

EXPLAIN

(Be sure to let students explain to you what they learned!)

The concepts of precipitate and filtrate are introduced in the directions on student sheet 5.1 Be sure students understand these concepts. Question number 3 is the focus of the activity. When you relate the vinegar to acid rain and the precipitate to stored toxic copper (possibly in a landfill), students will realize that precipitation is an ineffective way to solve the toxic copper waste problem. It is at this point that leaching would be introduced as the procedure in which the acid rain would dissolve the precipitate and return the toxic copper to the environment as part of the groundwater.

The teacher's manual has a good description of "detoxified" and "preconcentration" that may be introduced at this time. The intellectual ability of the class will determine how much chemistry will be used to explain the chemical reactions they just observed or if the concepts of detoxified and preconcentration are to be introduced.

Narration

Your research suggests that there is a process that will convert the liquid toxic copper waste to a solid. With a great deal of interest, you download the directions for this process and decide to test it.

QUESTION TO ANSWER

Is there a process that will convert the liquid toxic copper waste to a solid that has the ability to resist leaching by acidic water, is safe, and cost effective?

Activity Six

Solidification/Fixation

Concepts to be learned: fixation, solidification, synergistic effect

The directions in the teacher's manual suggest that this activity be divided into two parts. Part one tests the effectiveness of cement and sodium silicate separately. Part two tests the combination of cement and sodium silicate. It may be more time efficient to have the cement/copper chloride waste and the sodium silicate/copper chloride waste prepared ahead of time (as suggested in the manual) but tested on the same day as the combination cement/sodium silicate/copper chloride waste from part two. The "narration" associated with this module allows the instructor to combine parts one and two.

EXPLORE

Distribute Students Sheet 6.1 and follow the directions in both the teacher's manual and the student sheet.

EXPLAIN (Be sure to let students explain to you what they learned!)

Lead a discussion of the questions on student sheet 6.1. The data and the answers to those questions will provide the answer to the "question to answer" which introduces this activity. Solidification and fixation should be introduced after students have had the opportunity to observe the effect of cement and sodium silicate on the copper chloride waste. Be sure to utilize the effectiveness of the combination of cement and sodium silicate as a way to introduce the concept of synergistic effect.

After the above discussion, let the students know that additives are often used to reduce the mobility of pollutants, thereby making the waste acceptable for current land disposal requirements.

Ask the students to identify the advantages of converting a liquid solution of hazardous materials into a stable solid. Try to reach consensus on the following points:
(In the teacher manual, this discussion occurs before the activity. However, the discussion cannot be rich until or unless the students have had experience with the solidification and/or fixation process.)

1. As a solid, the material is less likely to contaminate large areas by spreading.
2. Solids are less likely to corrode containers, and therefore preventing leaking of the material into the surrounding area.
3. In becoming a solid, the hazardous material may be changed into a substance that is no longer hazardous because of a chemical reaction that fixes the toxic substance.

Elaborate/Narration

At this point you believe you have researched every possible way for disposing of the toxic copper waste. You recall that when you were hired, the first task on your agenda was to find a safe, efficient, and cost effective method for disposal of the toxic copper waste. Now after all your investigations (from activities two, three, four, five, and six), you are ready to organize that information and make a recommendation to the board of directors.

QUESTION TO ANSWER

Which method of waste disposal is the safest, most efficient, and cost effective?

Activity Seven

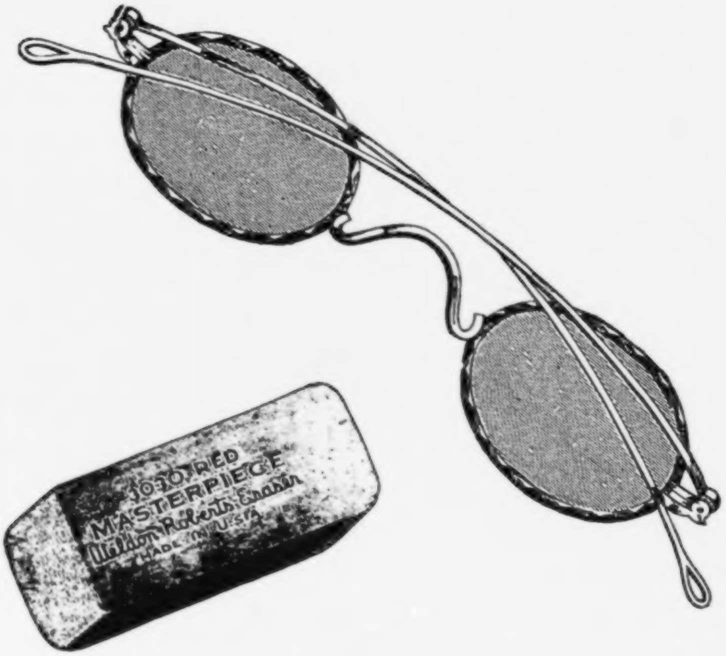
Waste Management

Distribute student sheet 7.1

Students work in their research groups and make a recommendation to management based upon the evidence they have collected. They must include the reasons for their conclusions. As part of the lesson, the students may be required to present their conclusion(s) to individuals from industry who hold jobs similar to the one described in this unit.

The teacher's manual provides excellent background for this activity.

RESOURCES



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Instructional Model

The **learning cycle** was first proposed by Robert Karplus and used in the SCIS and ISCS materials among others. A variation of the model, first proposed by Roger Bybee and Leslie Trowbridge (1990), has five stages-the five 'E's: **engage, explore, explain, elaborate, and evaluate**.

Engagement

These activities mentally engage students by asking a question, defining a problem, or showing a discrepant event and focus on the instructional task. They capture students' interest and help them make connections with what they know and can do.

Exploration

Then the students encounter specifically designed exploration activities allowing students in the class to have common, concrete experiences that begin building concepts, processes, and skills. Engagement brings about disequilibrium; exploration initiates the process of equilibration. The purpose is to provide experiences that a teacher can use later to formally introduce a concept, process, or skill.

Explanation

The process of explanation provides the students and teacher with common use of terms relative to the learning task. The teacher directs student attention to specific aspects of the engagement and exploration experiences. First, students are asked to give their explanations. Second, the teacher introduces scientific or technological explanations in a direct and formal manner. The teacher should clearly base the initial part of this phase on students' explanations and clearly connect the explanations to experiences in the engagement and exploration phases of the instructional model. Commonly used techniques are oral explanations, videos, films, or educational software.

Elaboration

Further activities serve to help students elaborate on their understanding of the concept(s). It is important to involve students in further experiences that extend or elaborate the concepts, processes, or skills. Interaction between the students is essential during the elaboration stage because it allows students to construct a deeper understanding of the concepts.

Evaluate

It is important that students receive feedback on the adequacy of their explorations. The teacher can use a variety of formal and informal procedures for assessing student understanding, which can occur from the beginning of the teaching sequence. It is at this stage of the model that the teacher evaluates students' understanding of concepts and proficiency with skills. Students should do more than recite isolated bits of information and vocabulary words.

Trowbridge, Leslie W. & Bybee, Roger W., (1990) *Becoming A Secondary School Science Teacher.* New York: Macmillan.

Science Process Skills

Learning How To Learn!

Some people refer to developing science process skills as "learning how to learn." Children learn how to learn by thinking critically and using information creatively

Types of Process Skills

Basic Skills

If children show that they can observe, classify, communicate, measure, estimate, predict, and infer, they are showing understanding of basic science processes.

Observation

Use all senses; for example: "the object is hard, gray, round, and the size of a baseball." Some instruments add precision to observations: thermometers, balances, computers, voltmeters.

Classification

Requires that children organize their observations that carry special meaning: color, size, shape, properties, etc.

Communication

Children use language–written, spoken and symbolic–to express their thoughts. This is encouraged by teachers who ask children to define works and terms operationally, to describe objects and events as they are perceived, and to record information and make data tables, graphs, and models to show what they have found. For example: Describe an observed change in a river over time by speaking, writing, or showing in a graph or data table.

Measurement

Meter sticks, balances, graduated cylinders, clocks, calculators etc.

Estimation

Using judgment to approximate an amount or a value; for example: "I think the chair is about one meter high or the glass looks like it has about 300 ml of water."

Predictions

Refers to types of thinking that requires our best guesses based on the information available to us. A teacher can stimulate predictive thinking by asking children to review the observed properties of objects or events and asking them to tell what they think will happen when a change of some sort is made.

Inferences

Conclusions about the cause of an observation. Consider the question: Will a certain object sink or float when placed in water? Children may observe that all light-weight objects from their collections float in water and infer that light weight is the cause of floating.

Science Process Skills (continued)

Integrated Science Process Skills

Students consider more than one thought at a time; i.e., several of the basic process skills can be combined for greater power to form the tools used to solve problems.

Identifying and Controlling Variables

This requires students to identify aspects of an experiment that can affect its outcome and to keep constant as many as possible, while manipulating only the aspect or factors (variables) that are independent.
Example: Vary only the amount of fertilizer used on similar plants while keeping soil type, amount of sunlight, water, and temperature the same.

Defining Operationally

Occurs when children use observations and other information gained through experience to describe or label an object or event. Example: An acid is a substance that changes bromthymol blue indicator from blue to yellow.

Forming Hypotheses

Similar to prediction but more controlled and formal. It is using information to make a best educated guess about the expected outcome of an experiment.

Experimenting

Requires using many thinking skills to design and conduct a controlled scientific test:

- asking research questions
- identifying and controlling variables
- conducting the experiment
- forming a hypothesis
- using operational definitions
- interpreting the data

Graphing

Students must convert measurement into a diagram to show the relationships among and between the measures. Example: Construct a graph to show the heights of the plants, experimental and control, for each day of the experiment.

Interpreting Data

Requires students to collect observations and measurements (data) in an organized way. Requires them to draw conclusions from the information obtained by reading tables, graphs, and diagrams

Forming Models

Requires students to create an abstract (mental) or concrete (physical) illustration of an object or event.
Example: Draw a representation of the cause of the phases of the moon.

Investigating

A complex process skill that requires students to use observations, to collect and analyze data, and to draw conclusions in order to solve a problem.

Science Definitions

Facts

Facts are specific, verifiable pieces of information obtained through observation and measurement.

Concepts

Concepts are abstract ideas that are generalized from facts or specific, relevant experiences.

Generalizations

Generalizations enable us to relate and explain apparently different events.

Principles

Principles are more complex ideas based on several related concepts.
"The reason people recycle solids is because they create a lot of waste." The concepts are creation, waste, and recycling

Theories

Theories consist of related principles that provide an explanation for a phenomenon. The purpose of a theory is to provide a best explanation based on evidence. They are used to explain, relate, and predict. For example, "Commercial marketing practices and convenience packaging are responsible for much of the Eastern United States' landfill problems."

Rubric for Assessing Basic Process Skills

Name	Observation	Classification	Communication	Measurement	Estimation	Prediction	Inferences
Jack Hill	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Jill Hill	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Alice Wonder	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Bat Man	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Jim Shoe	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Babe Ruth	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Jack Frost	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Christa Shanda	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Rubric for Assessing Integrated Science Process Skills

Name	Identifying & Controlling variables	Defining Operationally	Forming Hypotheses	Experimenting	Graphing Data	Interpreting	Forming Models	Investigating
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

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